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PROCEEDINGS

OF THE

Bournemouth Natural Science Society

VOL. LII

SESSION 1961-62

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PROCEEDINGS of the

Bournemouth Natural Science Society

VOL. LII.

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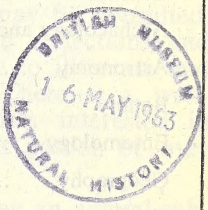

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39 CHRISTCHURCH ROAD, BOURNEMOUTH, 1963

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Introductory Note

The objects of the Society are declared in the second of its Rules to be "the promotion of the study of Science in all its branches, and of Public Education, by means of Lectures, Field Meetings, the reading and discussion of Papers, and in any way that the Council of the Society shall deem advisable."

The branches of Science at present represented are as follows:—**Archaeology and History, Astronomy, Botany, Entomology, Geography, Geology, Microscopy, Photography, Physics and Chemistry, and Zoology.**

During the **Winter Session,** from October to April, frequent meetings are held, comprising Lectures on subjects of scientific interest, illustrated by lantern slides, films, epidiascope, diagrams, specimens, and experiments.

Throughout the **Summer Session,** Field Meetings on an average of two or three a week, are held in suitable places in the neighbourhood of the town, or Coach and Train Tours are arranged to districts of scientific interest at a distance.

The management of the Society is vested in a Council, which is elected at the Annual General Meeting.

The Society possesses a Library available for the use of members. Books may be borrowed by members, and there is a Reading Room in which works of reference may be consulted. The Museum contains many valuable scientific collections and specimens. The Library and the Museum serve to illustrate and illuminate the ten Sections of the Society. There is a well-equipped Dark Room for the use of members interested in Photography. The house stands in a pleasant garden of over an acre.

Members are elected by the Council, and pay an annual subscription of £1 10s. 0d. for full membership, or £15 for Life Membership. An Entrance Fee of 5/- is payable upon nomination for election. The Family Subscription (for members of a family living in the same house) is as follows:—First Adult Member, £1 10s. 0d.; Second Adult Member, £1; each additional Adult Member, 10/-; Children between 12 and 18 years, 10/- (Associate Members). Members living six miles or more from 39 Christchurch Road pay half the above rates. Renewable monthly membership, 5/-, is available.

A bi-monthly Programme, giving full details of all meetings, is posted to every member, and a Volume of Proceedings is published annually, of which adult members receive a copy.

Application Forms for Membership and further particulars may be obtained from the Honorary Assistant Secretary,

G. A. SLATER,
6 Wyndham Road,
Parkstone, Poole.

Bournemouth Natural Science Society

OFFICERS AND COUNCIL FOR 1962-63

N.B.—University and other qualifications are only attached at first mention of names.

President

F. H. PERRING, M.A., Ph.D.

Chairman of Council

H. V. HARRIS

Deputy Chairman of Council

MISS D. M. LOWTHER, B.SC.

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Astronomy: W. P. WINTER, B.SC.
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Entomology:
Geography: MISS F. M. EXTON, B.A.
Geology: D. A. WRAY, Ph.D., M.SC., F.G.S.
Microscopy: A. J. AIERS, M.I.Mech.E., M.I.P.E.
Photograpy: MISS U. M. OGLE
Physics and Chemistry: H. E. CLARKE, M.A., B.SC., F.R.I.C.
Zoology: H. V. HARRIS

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A. J. BUTCHER, F.R.I.B.A.

Hon. Solicitor

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Chairman: W. L. WHITTLE
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Deputy Chairman: MRS. A. A. BAILEY
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Ciné: D. J. DUDLEY *(Leader)*, MRS. I. SEWELL

Bournemouth Natural Science Society
List of Members

Revised to 3rd December, 1962

*HONORARY MEMBER — wGILBERT WHITE FELLOWSHIP
oORIGINAL MEMBER — †PAST PRESIDENT
vVICE-PRESIDENT — lLIFE MEMBER
aASSOCIATE MEMBER

The year of election is given before the name of each member

1952	Adam, Miss A. Irvine	17 Linwood Road
1961	Adams, D. T., M.A.	13 Sandy Mead Road, Queen's Park
1961	Adams, Mrs. M.	" "
1955	Adams, Mrs. K. L.	1 Gleneagles Avenue, Parkstone
1958	Agar, R.	84 Howard Road
1958	Aiers, A. J.	Maasdam, Golf Links Road, Ferndown
1958	Aiers, Mrs.	" "
1961	Aiers, Miss E. M.	Flat 2, Earlston, 8 Portarlington Road
1962	Allen, Mrs. A. W. S.	C.43, San Remo Towers, Boscombe
1958	Allen Mrs. F. C.	8 Twynham Road, Southbourne
1960	Alsford, C.	Long Field, Church Road, Ferndown
1960	Alsford, Mrs. J. R.	" "
1956	Ambler, Lieut. Col. M. J.	Min's Cottage, 5a Branksome Wood Road
1955	Ambler, Mrs. A.	" "
1957	Arnold, L.	11 Danecourt Road, Parkstone, Poole
1957	Arnold, Mrs. E. L.	" "
1952	lAtkinson, Mrs. A., S.R.N.	40 Palmer Road, Oakdale, Poole
1950	Bailey, J. H.	39 Strouden Avenue
1950	Bailey, Mrs. A. A.	"
1962	Bailey, Mrs. E. M.	68 Portchester Road
1955	Bailey, Miss F. E. L.	57 St. Catherine's Road, Southbourne
1955	Bailey, Miss G. L.	" "
1955	Balch, Miss M. M., M.B.E., B.A.	42 Saxonbury Road, Southbourne
1962	Balfour-Browne, Miss E. F.	Acorn Cottage, Station Road, Verwood, Dorset
1962	Ballinger, F. H., M.B.E.	4/32 Dean Park Road
1962	Ballinger, Mrs. D. M.	"
1957	Baly, Miss O. M.	70 Brackendale Road
1956	Bamber, Mrs. C. T.	Walhampton Cottage, Lymington
1951	Barker, Mrs. E.	21b Upton Way, Broadstone
1957	Barton-Bullock, Mrs. L.	2 Ravenscourt Road, Southbourne
1956	Bartrop, W. T. C., B.COMM.(LOND.), J.P.	11 Penrith Road, Boscombe
1956	Bartrop, Mrs. M. L.	" "
1962	Bell, Mrs. A.	1 Methuen Road
1944	Bell, T. M., B.A., M.B., B.Ch., M.R.C.S., L.R.C.P.	5a Stourwood Avenue, Southbourne
1941	Bell, Mrs. R. M.	" "
1942	Bennett, Miss D.	Caradon, Canford Cliffs Avenue, Parkstone, Poole
1942	Bennett, Miss M.	" "
1962	Bennett, Rev. J. N.	9 Moor Vale Road, Moordown
1960	Bennett, Mrs. J. K. M.	" "
1947	Berrill, Miss M. E.	Russell Court Hotel, Bath Road
1942	Bickel, T. H.	10 Ormonde Road, Branksome Park, Poole
1962	Binks, Miss I.	78 Southbourne Road, Southbourne
1960	Binns, Miss M. E., M.R.C.S., L.R.C.P.	The Lighthouse, Hurn Road, Ringwood

1946	Blackmore, H. C., L.D.S., R.C.S.	15 Keswick Road, Boscombe
1946	Blackmore, Mrs. E. E.	" "
1950	Bland, Mrs. S.	1 Sandringham Road, Parkstone, Dorset
1955	Blicq, Miss G.	Merlyn, Marine Drive, Barton-on-Sea, Hants
1954	Boggust, A. E. V.	Southbourne Park Garage, 78 Tuckton Road, Southbourne
1960	Boite, E. E. G.	17 Browning Avenue, Boscombe Manor
1950	Bone, Miss M. R. M.	28 Westbourne Park Road
1957	Booth, Mrs. L.	41 Cedar Avenue, Christchurch, Hants
1956	Boulton, Miss L.	2a Stour Road, Queen's Park
1962	Bowers, Mrs. M. P.	2 Wotten Court
1956	Brain, Miss C. M.	16 Knole Road
1962	Brown, Miss V. C.	3 Wollstonecroft Road, Boscombe
1959	Bruford, Mrs. E.	113 Alumhurst Road, Westbourne
1920	Brumell, Miss M.	7 Windermere Road
1960	Brunstrom, Mrs. J. B.	6 Bradburne Road
1951	wBull, A. W. M., C.B.	Broom House, Chiltern Road, Hitchin
1930	Bury, Miss G. J.	Flat 4, Berne Court, Grove Road
1946	Busby, Miss A. G.	Flat 4, 77 Haven Road, Canford Cliffs
1952	Butcher, A. J., F.R.I.B.A.	"Hilton", Dudsbury Avenue, Ferndown
1957	Butler, G. W.	Old Park Farm, Lytchett Matravers, Dorset
1960	Butler, Mrs.	" "
1954	Byrt, A. H., C.B.E.	14 St. Winifred's Road
1953	Cadwell, W. H., M.I.C.E.	238 Higher Blandford Road, Broadstone, Dorset
1953	Cadwell, Mrs. D. A.	" "
1928	lCalkin, J. B., M.A., F.S.A.	Virginia House, Langton Matravers
1961	Campbell, Miss M.	"Chadwell", Friars Road, Friars Cliff, Christchurch
1958	Capstick, F., F.I.A.C.	7 Viking Way, Southbourne
1958	Capstick, Mrs. W.	" "
1962	Carter, Mrs. E. E.	Flat 1, Weston Hall, Durley Gardens
1955	Caswell, G. E., M.B.E., M.C.	67 Chatsworth Road
1955	Caswell, Mrs. K.	"
1943	†vChambers, Ernest, F.L.S.	18b Milton Road
1950	Chambers, Mrs. E.	"
1955	Chambers, Miss H. M.	Stratton Audley, 9 Tower Road, Branksome Park, Poole
1959	Charter, A.	Flat 3, 1 Cavendish Place
1959	Charter, Mrs. E. E.	" "
1945	Cheesman, Mrs. A.	The Ken, Walkford, Christchurch
1945	Child, Miss L. M.	Flat 31a, Southbourne Road, West Southbourne
1912	*Chilver, Miss K. M.	2 Cromer Road
1961	Chivers, Mrs. J. Maclean	10 Glenroyd Gardens, Southbourne
1951	Chomé, E. E. P.	6 Alyth Road
1942	Chomé, Mrs. W.	"
1950	Churches, Mrs. E. W., M.B., Ch.B.	The White House, Colebrook Street, Winchester
1962	Clark, Mrs. F. M.	12 Alum Chine Road
1958	Clarke, Miss A. M., B.A.	South Lodge Flat, Rope Hill, Boldre, Lymington, Hants.
1945	†vClarke, H. E., M.A., B.SC., F.R.I.C.	4 Gardens Court, Parkstone Road, Poole
1945	Clarke, Mrs. M.	" "
1927	*Clay, R. C. C., M.D., F.S.A.	The Manor House, Fovant, Wilts
1958	Cocke, M. H.	18a Penn Hill Avenue, Parkstone, Dorset
1961	Coe, Mrs. G.	33 Cavendish Road
1946	Cohen, E., F.Z.S., M.B.O.U.	Hazelhurst, Sway

1926	*Cooper, H. A.	White Lodge, 8 Oban Road
1941	LCooper, Mrs. E. M.	„ „
1951	LCooper, Miss R. I.	„ „
1945	Cooper-Hunt, Major C. L., M.A., R.A.Ch.D. (Retd.)	40 Marine Drive East, Barton-on-Sea
1945	Cooper-Hunt, Mrs. E. G.	„ „
1957	Corby, J. W.	Winkton House, Winkton, Christchurch
1952	Corser, Miss G. M.	3 Aspen House, Elm Grove Place, Salisbury, Wilts.
1956	Cox, Miss M. G. E.	Chantelle, 10 Dulsie Road, Talbot Woods
1948	Cox, W. S. I., F.R.E.S.	248 Castle Lane
1948	Cox, Mrs.	„
1962	Cragg, Miss M. A.	Bourne Hall Hotel, Westbourne
1956	Crawshaw, Mrs. M.	2 Spring Slade, Cliff Drive, Canford Cliffs
1962	Critchley, Mrs. M. M.	35 Seaward Avenue, Southbourne
1903	*oCurtis, W. Parkinson, F.R.E.S.	131 Princess Road
1959	Cuthbertson, Miss E.	179a Richmond Park Road
1959	Cutland, W.	South Riding, Honey Lane, Burley, Hants
1959	Cutland, Mrs. H. M.	„ „
1961	Dale, Mrs. L. D.	401 Holdenhurst Road
1960	Dalrymple-Watt, Lady G. V.	1 Berwick Road, Talbot Woods
1959	Danne, Miss E. M. M.	Flat 5, 12a Branksome Wood Road
1952	Day, Mrs. E. T.	10 Barton Gardens, Dawlish, Devon
1955	Deakin, R. H., M.Sc.	Coppins, Harvey Lane, Canford Magna, Wimborne
1960	Deakin, Mrs. E. M.	„ „
1957	Dear, Miss D.	23 Burnham Drive
1930	*de Castro, H.	"Yarlington", Springdale Avenue, Broadstone
1962	Deighton, Mrs. E.	35a Lansdowne Road
1962	Dennis, Miss R. S., S.R.N., S.C.M.	32 Crabton Close Road
1935	Derry, Mrs. H. E.	Charnwood, 146 Belle Vue Road, Southbourne
1947	Dewdney, H., F.R.C.O., L.R.A.M.	15 Wellington Road
1962	Dickson, A. A.	"Muskerry", 23 Sandy Lane, Upton
1961	Dixon, Sir Arthur, C.B., C.B.E., B.A.	Bourne Hall Hotel, Westbourne
1961	Dixon, Mrs. H. M.	3 Richmond Park Crescent, Boscombe
1949	Dixon, Miss H. C.	Meyrick Grange Hotel, 50 Christchurch Road
1960	Dobbie, Miss C. E.	The Lighthouse, Hurn Road, Ringwood
1958	Domney, Miss M.	Flat No. 2, 77 Haven Road, Canford Cliffs
1960	Dool, Mrs. N. M.	55 East Howe Lane
1960	ADool, Miss J. P. M.	„
1961	Draper, Mrs. G.	51 Branksome Wood Road
1953	Dudley, D. J.	17 Widdicombe Avenue, Parkstone, Poole
1955	Dudley, Mrs. I.	„ „
1953	Eaton, Mrs. V. W.	33 Branksome Wood Road, Bournemouth West
1956	Edmonds, Miss K. E.	74 Namu Road, Winton
1960	Edwards, Mrs. F. M.	"Georgian House". 2 Priory Road
1962	Edwards, Miss N. J.	2 Oban Road, Talbot Woods
1946	Ellison, Prof. F. O'B., M.D., F.R.A.S.	Pine Apple Cottage, Burton
1961	Engel, E. C.	53 Alum Chine Road
1955	Exton, Miss F. M., B.A.	39 Branksome Wood Road
1960	AExton, Miss J. M.	„ „
1959	Falvury, P.	Alpine, Warren Road, Bournemouth W.

1919	Farmar, Mrs. K. A.	Whitton Lodge, Stevenson Crescent, Parkstone, Poole
1950	Farquhar, Mrs. L.	3 Lonsdale Road
1953	Farwell, Mrs. S. M. A.	Latch Farm, Fairmile, Christchurch
1956	Fergusson, Mrs. C.	708 Christchurch Road, Boscombe
1957	Fiddes, Mrs. I. A.	Tetherdown, Cull Lane, New Milton, Hants
1960	Filer, Miss A. N.	34 Harewood Avenue, Boscombe East
1934	Finnis, Miss F. M.	27 Julian's Road, Wimborne
1951	†wFisher, J.	The Old Rectory, Ashton, Northampton
1957	Fishlock, H. W., B.Sc.	319 Belle Vue Road, Southbourne
1957	Fishlock, Mrs. F.	" "
1950	Fletcher, Mrs. V.	Teelings Cottage, South Baddesley, Lymington
1954	Follett, Mrs. V.	Windward, Stevenson Crescent, Parkstone, Poole
1962	Foote, H. N., F.S.M.C., D.Opt.	Park Walk, Shaftesbury, Wilts.
1942	Ford, Miss C.	13 Beaufort Road, West Southbourne
1945	Foyle, A. A.	"Therapeia", Wilderton Road, Branksome Park
1953	Fraser, Miss M. H., B.A.	2 Ken Road, Southbourne
1960	Gahan, Mrs. M.	215 Holdenhurst Road
1961	Galbraith, T., J.P.	71 Carbery Avenue, Southbourne
1957	Galbraith, Mrs. A.	" "
1956	Gandy, Mrs. L.	11 Cranleigh Gardens, Southbourne
1955	Gardiner, P. C., F.R.I.C., M.I.Chem.E., M.Inst.Gas.E.	61 Ophir Road
1961	Gee, Dr. Ed. R., M.A., Sc.D., D.K., F.G.S.	3 Felton Crescent, Highcliffe
1961	Gordon Gerrard, Cdr. Wm., R.N.	4 Astell Street, London, S.W.3
1961	Gerrard, Mrs. S. T.	" "
1951	Goddard, Miss E. F.	215 Holdenhurst Road
1959	Gompel, M. E.	12 Chigwell Road
1937	Gompel, Mrs. M. K.	"
1960	Good, Emeritus Prof. Ronald, M.A., D.Sc.	8 Durlston Road
1960	Good, Mrs. P. G.	" "
1949	Goodhart, Mrs. M. S.	West Thorpe, Lymington
1956	Goodman, Miss J. R.	Kenora, 6 Pine Wood Road, Branksome Park
1942	Gorringe, Miss K. M.	11 Branksome Dene Road, Westbourne
1956	Graham-Vine, Mrs. F. E.	Mount Royal, Terrace Mount, Bournemouth
1960	Grattan, Miss L. T.	Tower Cliff Hotel, West Cliff
1953	Gray, Miss E.	44 Edmondsham House, Terrace Road
1956	Green, Miss G. M., M.A.	17 Clifton Road, Parkstone, Poole
1944	Greg, Mrs. F. L.	9 Hengist Road, Boscombe
1955	Gregory, Mrs. L. G.	Flat 2, 4 Manor Road
1957	Griffin, Miss M. J. E.	19 Corhampton Road, Boscombe
1961	Guthrie, M.	16 Ashford Road
1961	Guthrie, Mrs. J. H.	"
1962	Guthrie, Mrs. I. H.	54 Carbery Avenue, Southbourne
1941	Gwyther, W. T.	12 Foxholes Road, Southbourne
1956	Habershon, Miss E. M.	Leas Court, Cliff Drive, Canford Cliffs
1931	Haines, Mrs. E. M.	Appleslade, Linwood, Ringwood, Hants
1951	Haines, Miss G. M.	" "
1951	Haines, Miss R. M.	" "
1961	Haines, Miss E. S.	"Little Orchard", Godshill, Fordingbridge, Hants

1962	Hall, Miss E., B.Sc. (Hons) Lond.	16 Beresford Road, West Southbourne
1957	Halliday, Mrs. M. G.	20 Meyrick Park Crescent
1962	Hammond, R. G.	12 Padfield Close, Southbourne
1953	Hancock, Mrs. C. E.	912 Castle Lane East, Iford
1959	Hannam, B., M.P.S.	Windyridge, Bashley, New Milton, Hants
1955	Hannam, Mrs. W.	,, ,,
1959	Hards, Mrs. D. K.	23 St. Paul's Road
1960	Hardy, Miss L. H.	20 The Grove, Redhill Park
1951	Harlock, Miss M. L.	44 Heather View Road, Branksome
1961	Harper, Miss A. C.	"Chadwell", Friars Road, Friars Cliff, Christchurch
1962	Harris, Miss H. D.	Flat 4, Overcliffe Mansions, Manor Road
1962	Harris, R. G., F.I., Ceram.	,, ,,
1955	Harris, H. V.	Monterey, Lone Pine Drive, Ferndown, Dorset
1958	Harris, Mrs. W. I.	,, ,,
1958	Hart, Miss C. L., S.R.N., C.M.B.	The Thatched Cottage East, Godwin's Croft, Bransgore, Hants
1961	Harvey, Dr. Mrs. F. E., M.B., Ch.B.	C21, San Remo Towers, Boscombe
1959	Harvey, Miss G. E. J.	50 Alum Chine Road
1932	*Hatton, Mrs.	Dutch House, Cliff Road, Barton-on-Sea
1951	Hawker, Mrs. E.	64 Alumhurst Road
1961	Hawthorne, S. H.	1 Gresham Road, Winton
1949	Hayley, Miss V. G.	Sandykeld Hall, Manor Road
1951	Haymann, Miss M. S.	39 Queen's Park South Drive
1961	Hayward, H. A., O.B.E., F.G.S.	18 Seacroft Avenue, Barton-on-Sea
1960	Hearn, Miss I. D.	36 Brackendale Road
1956	Heath, Mrs. C. J.	2 Richmond Court, Hawkwood Road, Boscombe
1954	Henderson, Miss V.	19 Ashmore Avenue, Hamworthy, Poole, Dorset
1954	Hermon, J. A.	43 Stourcliffe Avenue, Southbourne
1961	Herring, Mrs. J. M., M.A. (oxon).	6 Hope Lodge, 6 Belle Vue Road, Lower Parkstone
1961	Higgs, Miss D. H.	"White Gates", 1036 Ringwood Road, West Howe
1961	Higgs, Mrs. M.	"White Gates", 1036 Ringwood Road, West Howe
1952	Hilton, Mrs. D.	East Dyke, Higher Clovelly, Bideford
1956	Hinton, Miss E. M.	1 Lonsdale Road
1962	Hipperson, Miss M.	69 Headswell Avenue
1962	Hodson, Professor F., Ph.D., F.G.S.	Geology Dept., University of Southampton
1961	Hodgson, Miss N.	45 Howard Road
1960	Holbrook, H. S., B.Sc., M.I.E.E., Fel.A.I.E.E.	Flat No. 6, 20 Portarlington Road
1962	Holmes, Mrs. N. E. F.	7 St. John's Road, Boscombe
1952	Holroyd, G.	4 Beechey Road
1961	Hooton-Smith, E. W.	"Wayneflete", 36 Wellington Road
1961	Hooton-Smith, Mrs. B. E.	,, ,,
1957	Hunt, W. H.	Flat 1, 5 Alton Road, Parkstone
1954	Hunt, Mrs. A. K., B.Sc.	,, ,,
1952	Imlach, Mrs. M. G., B.A.	Crofton, 2 Redcotts, Wimborne, Dorset
1954	Irwin, J. V.	16 Duncliff Road, Southbourne
1954	Irwin, Mrs. B. C.	,, ,,
1959	Jackson, Miss M.	1360 Christchurch Road
1933	James, Mrs. M. G.	70 St. Alban's Avenue
1960	James, W. S.	Oaklea, 115 Tuckton Road, Southbourne

1945	Jenkins, Miss P.	Hawkhurst Court, Wisborough Green, Sussex
1957	Jenoure, Miss C. A.	Eagle Crest, Belle Vue Road, Parkstone, Poole
1957	Jenoure, Miss D.	" "
1958	Johnson, H. N.	30 Canford Cliffs Road, Parkstone
1961	Johnston, Dr. M. D.	241 Charminster Road
1962	Jones, Miss O. E. C., S.R.N., S.C.M.	Hobourne Farm, Highcliffe, Christchurch
1956	Keith-Walker, S.	Hawkley, Lower Pennington Lane, Lymington
1928	Kendall, Miss G. J., A.R.C.M.	20 Serpentine Road, Poole
1946	King, Miss A.	Mercury House, 14 Florence Road, Boscombe
1962	King, M. P., B.A., A.K.C.	17 Strouden Road, Winton
1944	Kirke, Miss M.	Flat 3, Fairthorne Court, 27a Bodorgan Road
1959	Knight, Miss J.	106 Petersfield Road
1952	Lacey, Miss M. A.	10a Wimborne Road
1959	Lake, Miss M., B.A.	43 Stirling Road, Winton
1962	Lane, Miss J. P.	34 Glenferness Avenue
1956	Lavender, J. H., B.SC., A.R.C.S.	Heather Lodge, Bransgore, Christchurch, Hants
1959	Lawes, A. V.	48 Seafield Road, Southbourne
1961	Lawton, Mrs. E.	Eastcliff Towers, East Cliff
1962	Leake, Mrs. I. B.	21 Langside Avenue, Parkstone
1958	Leeland, Mrs. F.	34 Noel Road, Wallisdown
1960	Lees, Miss E.	9 Park Court, Western Road
1948	Leonard, Mrs. N.	1 Neville Court, Derby Road
1957	Le Roy, Miss E. S. H.	Forest Mead, Tyrell's Ride, Burley, Hants
1957	Le Roy, Miss M. C. G.	" "
1958	Le Sueur, Mrs. D. G.	49 Wellington Road
1961	Lewis, Miss D. M.	150 Mudeford Cove, Mudeford
1960	Lightfoot, B., O.B.E., M.C., M.A., F.G.S.	Bingley Farm Lane, Barton-on-Sea
1951	Lloyd, G. B., B.A.	58 Glenferness Avenue
1950	Locke, G. S.	85 Seafield Road, Southbourne
1950	Locke, Mrs. J. B. E., B.A.	" "
1947	Logan, Miss A.	157 Southcote Road
1952	Logie, Mrs. G.	Flat 4, St. Stephen's Mount, Richmond Hill
1939	Lowde, Miss E., B.A.	83 York Road, Broadstone
1951	wLowe, Mrs. D. M.	43 Marryat Road, Wimbledon, London, S.W.19
1934	v†Lowther, Miss D. M., B.SC.	Lonsdale, 15 Mayfield Avenue, Parkstone, Poole
1951	wLyver, Mrs. D. J.	Grove Lodge, Burgess Hill, Sussex
1956	Maddox, Mrs. L. M.	31 Egerton Road, Queen's Park
1960	Mann, B. C.	48 Keith Road
1960	Mann, Mrs. F. A. D.	"
1959	Mariette, Miss G. A.	4 Mansfield Avenue, Parkstone
1956	Marks, Miss K. M.	11 Ennerdale Road, Kew Gardens, Richmond, Surrey
1948	Markwick, Miss D.	The Leys, 79 Lansdowne Road
1946	Marshall, Miss D.	76 Palace View, Bromley, Kent
1954	Marshallsay, Miss E. N.	6 Overcliff Mansions, 1 Manor Road
1954	Marshallsay, Miss L. E.	" "
1958	Mate, Mrs. F.	8 Clifton Road, Parkstone, Poole
1957	Mathews, Miss G. B.	25 Wingfield Court, Manor Road
1960	Maxted, Mrs. G. E.	2a Wilfred Road, Boscombe

1950	Mayo, H. C.	18a Elgin Road
1950	Mayo, Mrs. S. E.	"
1956	McClay, H.	64 Blake Dene Road, Lilliput, Poole
1956	McClay, Mrs. A. E.	" "
1953	McKeown, Miss K. E.	15 Ravine Road
1961	McLeish, Mrs. M. B., B.Sc.	The Chestnuts, Bransgore, Christchurch
1962	Mead, Mrs. F.	Conifers, Old Farm Walk, Lymington
1950	Meggett, Lt. Col. E. E., V.D.	14 Southlea Avenue, Southbourne
1950	Meggett, Mrs. K. M., M.B.E.	" "
1962	AMesserschmidt, K.	Serrano 59, Madrid 6, Spain
1956	Middlemast, A. H.	86 Hengistbury Road, Southbourne
1956	Middlemast, Mrs. M.	" "
1958	Middleton, Mrs. J. M., B.Sc.	Horn Cottage, N. Bockhampton, Christchurch
1962	Milne-Day, D. L.	"Southfield", Burley, Ringwood, Hants.
1956	Mills, Miss N.	20 Marlborough Road
1962	Mitchell, Dr. M. S., M.R.C.S., L.R.C.P.	"St. Katherine's", Christchurch Road, Ringwood, Hants.
1959	Mitton, J. C.	3 Gainsborough Road
1957	Moore, W.	139 Alder Road, Parkstone, Poole
1962	Moore, Mrs. J.	139 Alder Road, Parkstone, Poole
1959	Morgan, Commander S. T., O.B.E., R.N. (Retd.)	Bracken Cottage, Blissford, Fordingbridge, Hants
1959	Morgan, Mrs. V.	" "
1955	Moss, C. A.	Flat E41, San Remo Towers, Boscombe
1962	Mott, Miss	2 Warren Avenue, Mudeford, Hants.
1951	wMundy, Miss M. E.	56 Lancaster Gate, London, W.2
1935	Muspratt, Mrs.	25 East Avenue
1961	Myers, A.	25 Gresham Road
1960	Nelson, A., F.C.A.	65 Alyth Road, Talbot Woods
1962	Nelson-Richardson, Mrs. L. G.	8 Benellen Road, Bournemouth
1939	Newsome, Mrs. E. C.	184 Belle Vue Road, Southbourne
1943	LNicholls, Miss G.	
1962	North, Miss S. F.	4 Hampton Court, 12a Branksome Wood Road
1962	Odell, F. H. B.	Cottonwood Hotel, East Cliff
1929	Ogden, Miss E.	1 Rossini Cottage, Hedgemead, Bath
1948	Ogden, F.	30 Grosvenor Court, Vale Road
1948	Ogden, Mrs. G.	" "
1950	Ogle, Miss U.	2 Frankland Crescent, Parkstone
1960	Ollier, G.	Rowans, 202 Harewood Avenue, Queen's Park
1960	Ollier, Mrs. B.	" "
1959	Oppé, E. F.	"Peakey", Worth Matravers, Swanage, Dorset
1948	Osborne, Mrs. B. E.	B6, San Remo Towers, Boscombe
1950	Owen, J. S.	2 Rotherfield Road, Boscombe
1944	Owen, Mrs. E.	" "
1958	Page, W. E., M.A. (Cantab.)	53 Petersfield Road, Boscombe East
1945	Paris, Lt.-Col. A., R.E. (Retd.)	11 Stourwood Road, Southbourne
1956	Paris, Mrs. G.	" "
1960	Parsons, Mrs. W.	50 Alum Chine Road, Westbourne
1916	*LPenrose, Miss F.	Little Picket, Hightown, Ringwood
1916	*L†Penrose, Miss M., B.Sc.	" "
1948	Perceval, Mrs. W.	7 Benellen Avenue
1960	Perry, C. C.	15 Seafield Road, Southbourne
1959	Perry, Mrs. K. E.	7a Elms Avenue, Parkstone, Dorset
1961	Pesterfield, Miss M.	56 Gresham Road
1950	†Peters, Sir R. A., M.C., M.A., M.D., F.R.S.	3 Newnham Walk, Cambridge

1961	Phillips, P. P., Ph.D., F.R.I.C.	87 Bath Hill Court
1961	Phillips, Mrs. V. A. D.	"
1953	Pickering, V. T.	Francesca, Hightown, Ringwood, Hants
1953	Pickering, Mrs. C. G.	" "
1959	Pierce, Mrs. E. K.	4 Mansfield Avenue, Parkstone
1960	Piggott, H. E., O.B.E., M.A.	29 Harvey Road, Boscombe
1961	Pinnick, A. W.	Strudes Farrington, Blandford, Dorset
1961	Pinnick, Mrs. O. P. P.	" "
1962	Pipe, C. R.	29 Brightlands Avenue
1959	Piper, P. J., F.R.I.C.S.	8 Leigham Vale Road, Southbourne
1959	Piper, Mrs. M. G.	" "
1962	Poole, Miss C. E.	24 Namu Road, Winton
1955	Porter, Miss D. A.	Deveron Lodge, 2b Christchurch Road
1957	Powis, Mrs. M. E.	37 Wheaton Road, Pokesdown
1960	Price, Miss A.	Alma Cottage, Ringwood Road, Ferndown, Dorset
1946	Prideaux, Mrs. A.	Upmoor, Ravine Road, Canford Cliffs
1946	Prideaux, Miss C.	" "
1958	Prince, Mrs. D. E.	56 Alyth Road, Talbot Woods
1951	wQuillet, L. A.	"Sevenoaks", Springfield, Chelmsford
1953	Rayment, Miss S. M.	A7, San Remo Towers, Sea Road, Boscombe
1951	Rayson, Mrs. M. C. J.	5 Marston Road, New Milton, Hants
1945	†vRead, W. J., M.Sc., F.R.I.C.	15 Carbery Avenue, Southbourne
1951	Read, Mrs. H. A.	" "
1957	Reakes, Rev. G. S., B.A.	The Chalet, 21b Prince of Wales Road
1957	Reakes, Mrs. K. A.	" "
1956	Reynolds, C. R.	14 Foxholes Road, Southbourne
1945	Richards, Miss E. E., B.Sc.	8 Overcliff Mansions, Manor Road
1942	Richards, Miss M. C.	Stour Lodge, 21 Julian's Road, Wimborne
1958	Ridsdale, Mrs. M.	14 Erinbank Mansions, Manor Road
1954	Robertson, Miss V. L.	2 Berry Court, St. Peter's Road
1949	Robertson, Mrs. W. M.	51 Alum Chine Road, Westbourne
1953	Robins, F. W., F.S.A., F.R.G.S.	4 Harewood Avenue, Boscombe
1923	Roden, Miss E. M.	12 Walpole Road, Boscombe
1947	Rooke, Dr. K. B., M.B., B.Ch., M.B.O.U.	Cranbourne, Wimborne
1960	Rose, J.	120 Gladstone Road, Boscombe
1959	Rowe, Miss F.	23 Stourcliffe Avenue, Southbourne
1962	Rowland, Mrs.	1 Methuen Road
1962	Rushton, Mrs. E.	Flat 3, Crosby Court, Crosby Road
1951	wSalisbury, Sir E., D.Sc., F.R.S., F.L.S.	Croindene, Strandway, Felpham, Bognor Regis, Sussex
1954	Saunders, Miss W. A.	11 Portman Crescent, Boscombe
1938	Seare, Mrs. H.	Almer, Blandford
1951	wSecretan, S. D.	Swaines, Rudgwick, Sussex
1960	Sephton, Mrs. N., M.B., Ch.B.	Flat 1, 4 Talbot Avenue
1951	Sewell, Mrs. I.	4 Maundeville Crescent, Christchurch, Hants
1941	Sexton, Miss F.	60 Uplands Road
1962	Sharp, Miss F. E., A.A. Oxford	4 Prince of Wales Road
1933	Sheffield, Miss I. E.	6 Lonsdale Road
1950	Shillidy, G. A., C.I.E.	Flat No. 10, 31 St. Peter's Crescent
1944	LShorthouse, B.	Brookside Cottage, Exeter Lane
1937	Simmons, Mrs. I. M.	73 Spur Hill Avenue, Parkstone, Poole
1920	Simpson, N. Douglas, M.A., F.L.S., F.R.M.S.	3 Cavendish Road
1961	Sims, G. P. W.	22 Duncliff Road, Southbourne
1961	Sims, Mrs. G. P. W.	" "

1959	Slater, G. A.	The White House, 6 Wyndham Road, Parkstone, Poole
1959	Slater, Mrs. E. M.	" "
1959	Slieker, Miss H. R. M.	133 Seafield Road, Southbourne
1960	Smith, Miss Mabel, M.B.E., S.R.N.	1a Cecil Avenue, Queen's Park
1962	Smith, Miss M. J.	44 Richmond Park Avenue
1962	Smith, R. W.	56 Braemar Avenue, Southbourne
1959	Soar, Miss I. M.	11 Grosvenor Road
1940	Somerville, Mrs. S.	Rumah Kechil, Pinewood Road, Ferndown
1962	Sparks, Miss A.	"Altoffs", Vicarage Road, Verwood, Dorset
1962	Sparks, Miss M.	" "
1960	Statham, Miss B.	The Lighthouse, Hurn Road, Ringwood, Hants
1962	Stiff, Miss F. A.	55 Stirling Road
1962	Still, D. C., F.S.M.C., D.Opt.	56 Highfield Road, Moordown
1956	Stray, J. F.	Browngates, Barton Lane, Barton-on-Sea, Hants
1957	Stray, Mrs. S. V. M.	" "
1947	Stuart-Harris, Miss M., B.Sc.	Woodways, Merley Lane, Wimborne, Dorset
1946	Stuart-Harris, Miss W., B.Sc.	" "
1960	Sunderland, Mrs. R. B.	18 Spur Hill Avenue, Parkstone
1962	Swann, A.	2 Huntvale Road
1950	Sworder, Miss R.	c/o Barclay's Bank Ltd., 659 Christchurch Road, Boscombe
1960	Sykes, Mrs. H. M.	16 Amberwood Drive, Walkford, Christchurch
1962	Tarrant-Willis, F. E.	52 St. Osmund's Road, Parkstone
1955	Taylor, Mrs. B.	164 Belle Vue Road, Southbourne
1959	Thomas, J. W., B.Sc., L.L.B., M.I.E.E., BAR-AT-LAW	4 Albemarle Court, Manor Road
1961	Thomas, R. F.	5 Alyth Road, Talbot Woods
1961	Thomas, Mrs. E.	" "
1961	Thompson, Mrs. E.	13 Hannington Road, Boscombe
1951	wTierney, Dr. C.	Netherton, Coulsdon, Surrey
1951	wTierney, Mrs.	" "
1951	wTilling, W. G.	20 Streathbourne Road, Upper Tooting, London, S.W.17
1958	Titmas, Miss A. E.	Strathmore Nursing Home, 7 Stourwood Avenue, Southbourne
1956	Trail, Miss L. M.	c/o Westminster Bank Ltd., Norwood, London, S.E.19
1957	Trotman, H. L.	2 Oban Road
1961	Turnbull, A.	40 Southern Road, West Southbourne
1961	Turnbull, Mrs. A. M.	" "
1949	*Turner, G. A.	Winchester House, Fir Vale Road
1959	Tyler, E. Freeman	Alston, 43 Brackendale Road
1960	Tyler, Miss L.	" "
1962	Velden, Miss J.	"Little Oaks", Wimborne Road, Stapehill, near Wimborne
1950	Venning, Brig. F. E. W., C.B., C.B.E., D.S.O., M.B.O.U.	Pinewood, Butts Ash, Hythe
1950	Venning, Mrs. E. L.	" "
1950	Venning, Miss E. J. L.	" "
1961	Vincent, Mrs. A. M., B.A. (Tasmania)	Benniston House, 49 Christchurch Road
1961	Waldy, Mrs.	The Paddocks, Dover Road, Branksome Park

1955	Walker, Mrs. L. W.	14 Alyth Road
1961	Wallace, Miss J. B., B.Sc. (Econ.)	10 St. Ives Park, Ringwood, Hants.
1961	Wallis, Miss M. E.	2 Warren Avenue, Mudeford, Christchurch
1961	Walter, Mrs. J. M.	12 Heron Court Road
1951	wWard, W. S.	44 Lesser Avenue, Clapham Common, London, S.W.4
1952	Warden, Miss F. H., M.C.S.P.	12 Robert Louis Stevenson Avenue, Westbourne
1962	Wardroper, H.	10 Rushton Crescent
1941	Watson, Miss G. V.	C/o Westminster Bank Ltd., 27 Old Christchurch Road
1941	†LwvWatt, Mrs. W. Boyd, F.Z.S., M.B.O.U.	52 Wimborne Road
1946	Watts, Miss N. E.	33 Cavendish Road
1936	Weekes, Mrs. M.	3 Rotherfield Road, Boscombe
1947	West, Miss G. M.	The Knapp, Studland, Dorset
1958	West, I. M.	30 Wildown Road, Southbourne
1961	Weston, Miss A. S.	Flat 2, Earlston, 8 Portarlington Road
1958	Wheeler, C. A. P.	c/o Westminster Bank, 74 Kilburn High Road, London, N.W.6
1958	Whimster, Miss L.	Pinehurst Hotel, West Cliff Gardens
1924	Whitaker, Miss E. M.	22 Somerset Road, Boscombe
1924	Whitaker, S. E., P.A.S.I.	22 Selwood Road, Addiscombe, Croydon
1962	White, Mrs. A. W.	4 Clifton Road, Southbourne
1960	White, Mrs. E.	Cecil Lodge, Canford Crescent, Canford Cliffs
1960	White, N. C.	" "
1931	AWhite, S. J.	32 Iddesleigh Road
1955	Whittle, W. L., M.I.M.E., M.I.F., F.G.S., F.R.A.S.	31 Elgin Road, Parkstone, Dorset
1955	Whittle, Mrs. L.	" "
1955	Williams, Mrs. G. E.	Pineheath, De Maulley Road, Canford Cliffs
1962	Williams, I. L.	"St. Fagans", Ringwood Road, Verwood, Wimborne, Dorset
1958	Winckworth, Miss E. M. C., M.C.S.P.	18 Drummond Road, Boscombe
1950	v†Winter, W. P. B.Sc.	27 Horsa Road
1951	Winter, Mrs. H.	"
1956	Wise, Mrs. B.	55 Namu Road, Winton
1959	Witherby, H. L.	9 Commercial Road, Parkstone
1960	Withers, A. E.	13 Beechey Road
1960	Withers, Mrs. D. E.	"
1961	Witt, A. J.	26 Churchill Road, Boscombe
1948	AWood, Miss E. B., B.Sc.	4 New Park Road, West Southbourne
1958	Wood, F. J.	17 Montagu Road
1951	wWood, Mrs. L.	The Oaks, Sawbridgeworth, Herts
1956	Wood, T. E., M.A., LL.B.	21 Durley Chine Road
1957	Woodger, Miss M. J.	70 Brackendale Road
1903	*†ovWoodhouse, W. J., A.C.P., M.I.H.	29 Twynham Road, Southbourne
1960	Woods, Miss M.	Alma Cottage, Ringwood Road, Ferndown, Dorset
1953	Wootton, Miss E. M.	22 Elgin Road
1949	†vWray, D. A., M.Sc., Ph.D., F.G.S.	42 Canford Cliffs Road
1949	Wray, Mrs. A.	" "
1956	Wray, Miss J., S.R.N.	" "
1946	Wycherley, Mrs. L.	11 Hayes Avenue
1960	Yeatman, Mrs. M.	Lantern House, Avenue Road, New Milton
1958	Yule, Mrs. M. P.	29 Montagu Road

BOURNEMOUTH NATURAL SCIENCE SOCIETY.

Summary of the Accounts for the year ending September 30th, 1962.

1960/61	Receipts.	£ s. d.	£ s. d.
475 7 6	Subs. to Sept. 30, 1962	555 17 6	
47 17 3	Covenant Tax Refund ...	54 2 9	
			610 0 3
	Rents, etc.		
200 0 0	Royal Commonwealth Society	150 0 0	
75 0 0	Camera Club	75 0 0	
17 10 0	Other accommodation	—	
8 8 0	Hire of Hall, etc. ...	—	
9 9 3	Royal Commonwealth Society, gas refund	8 1 1	
7 2 2	Telephone	6 6 11	
1 5 0	Projector fees	1 10 0	
4 0 0	Sundries	10 0	
			241 8 0
31 12 0	Field Meetings (refunds)	3 0 0	
52 11 9	Garden Party	44 6 6	
12 4 7	New Year Party ...	12 15 8	
29 6 9	Teas (net)	23 19 7	
			84 1 9
	Total of Ordinary Receipts		935 10 0

1960/61	Payments.	£ s. d.	£ s. d.
127 1 2	Caretaker, Wages and Insurance ...	125 18 8	
35 3 9	Insurance	35 3 9	
774 15 1½	Maintenance	3089 0 10½	
217 11 0	Rates	234 7 8	
			3484 10 11½
22 6 0	Coal	26 9 10	
129 9 3	Gas	136 17 4	
65 4 9	Electricity	83 14 1	
7 2 6	Water	6 9 6	
			253 10 9
39 13 2½	Postages	46 16 3	
127 5 8½	Printing and Stationery	126 10 8	
67 0 0	Proceedings	73 10 0	
29 14 0	Telephone	36 12 8	
			283 9 7
15 0 0	Field Meetings ...	—	
40 17 6	Garden	61 16 0	
—	Museum	—	
8 7 5	Library	5 15 4	
			67 11 4

255	*4*	*3*	Interest on Investments	357	15	6		
52	*18*	*1*	Interest (Income Tax refund to 31-3-61)	189	18	9		
							547	14	3
			Receipts other than Ordinary					
7500	*0*	*0*	Transferred from Deposit Account ...				1650	0	0
—			Transferred from Library Account (sale of books) ...				310	0	0
—			Repayment of Bournemouth Corporation Mortgage ...				500	0	0
			Bal. at Bank, 30-9-61 ...	250	2	0			
			Cheque in hand ...	50	0	0			
			Cash in hand	2	6	1½			
							302	8	1½
							£4245	12	4½

17	*4*	*0*	Subscriptions to other Societies	12	14	0		
178	*0*	*2*	Sundries	42	18	9		
61	*17*	*6*	Extra Expenses ...	—				
							55	12	9
			Total of Ordinary Expenses				4144	15	4½
6909	*5*	*0*	**Payments other than Ordinary** —Nil.					
			Bal. at Bank, 30-9-62	97	19	4			
			Cheque in hand ...	2	8	6			
			Cash in hand		9	2			
							100	17	0
							£4245	12	4½

We have examined the above Accounts with the Books of the Society, and Vouchers for payments, and certify the same to be correct.

October 5th, 1962.

ALBERT V. LAWES
J. C. MITTON, A.C.A. } Auditors.
F. J. WOOD, Hon. Treasurer.

BUILDING FUND—Special Reserve

	£	s.	d.		£	s.	d.
Balance, 30-9-61	157	8	4	Balance on Deposit at Bank, 30-9-62	163	3	4
Interest, 30-9-62	5	15	0				
	£163	3	4		£163	3	4

DEPOSIT ACCOUNT

	£	s.	d.		£	s.	d.
Balance at Bank, 30-9-61	1682	5	11	Transferred to Current Account	1650	0	0
Interest, 30-9-62	68	3	8	Balance at Bank, 30-9-62	100	9	7
	£1750	9	7		£1750	9	7

CINE ACCOUNT

	£	s.	d.		£	s.	d.
Balance at Bank, 30-9-61	76	2	6	Hire of Films	21	15	3
Subscriptions to Cine Film Programmes ...	38	11	6	Projection Equipment	3	2	6
				Postage, Telephone and Stationery		18	9
				Balance at Bank, 30-9-62	88	17	6
	£114	14	0		£114	14	0

LIBRARY ACCOUNT

	£	s.	d.		£	s.	d.
Balance at Bank and in hand, 30-9-61	30	14	0	Librarian's Expenses	11	17	1
From Hon. Treasurer (refund of 1960-61 Librarian's Expenses)	5	15	4	Library Maintenance	3	19	0
				Transferred to Society Main Account	310	0	0
Sale of Books and Periodicals	346	13	0	Balance at Bank and in hand, 30-9-62 ...	57	6	3
	£383	2	4		£383	2	4

FIELD MEETINGS ACCOUNT

	£	s.	d.		£	s.	d.
Cash in hand, 30-9-61	2	17	5½	Expenses, Field Meetings	10	12	6
Surplus from Coaches	21	16	9	Transferred to General Account	3	0	0
				Cash in hand, 30-9-62	11	1	8½
	£24	14	2½		£24	14	2½

INVESTMENTS

			Cost			Approximate Value 30th Sept., 1962		
			£	s.	d.	£	s.	d.
£1000	3%	British Transport Stock, 1978/88	775	4	0	690	10	0
£1000	4½%	British Electricity Stock, 1974/79	992	1	6	902	10	0
£ 200	6%	County Borough of Bournemouth Mortgage Bond	200	0	0	200	0	0
£ 500	5¾%	County Borough of Bournemouth Mortgage Bond	500	0	0	500	0	0
£2500	4%	Consolidated Stock	1631	13	0	1735	10	0
£2300	5%	Conversion Stock, 1971	2093	8	0	2396	0	0
£1200	4½%	British Electricity Stock, 1974/79	984	4	0	1083	0	0
£1600	6%	Borough of Barking Mortgage Loan	1600	0	0	1600	0	0
£ 600	6%	Exeter Corporation Mortgage Loan	600	0	0	600	0	0
			£9376	10	6	£9707	10	0

Council Report for the year ending 30th September, 1962.

On the 30th September of this year our membership was 489, of which 13 belonged to the Gilbert White Fellowship. This figure represents a decrease of 2 in the past year.

Council regrets to announce the deaths of the following members during the year:—Miss E. R. Banham (1936), Mr. E. St. John Burton, F.G.S., F.R.S.A. (1922), Mrs. K. A. Farmar (1919), Mrs. L. G. Gregory (1955), Miss A. Knight (1948), Mr. R. B. Witherby (1956).

In September last Council accepted with regret the resignation of Mr. W. S. I. Cox from the Chairmanship of the Entomological Section, in which capacity he had served with distinction since 1941. Of especial value was his work on the classification and rearrangement of the Society's entomological collection. In expressing its thanks, Council records its pleasure that Mr. Cox has consented to remain a member of the governing body.

After serving for many years as Chairman of the Tea Committee, Miss A. King intimated her desire to resign from this position. In an exacting task Miss King gave freely of her time and effort. Council hopes that she will now experience more leisured enjoyment of the Society's amenities.

Since last year's report, Mr. D. J. Dudley has been appointed Cine Projectionist with Mrs. I. Sewell as his able assistant. In this important field Council acknowledges appreciatively the work of Mr. G. Holroyd and Mr. W. Moore who have put in months of intensive research work in their efforts to improve the quality of projection, particularly in respect of the epidiascope. This they have achieved but the work still continues.

Activities over the year, both indoor and in the field, may well be regarded as indicative of a live organisation. The bi-monthly programmes accurately reflect the various sectional interests and are in themselves a tribute to the planning of the Chairmen of Sections. Society lectures, 58 in all, have again been well attended and have, as previously, been thrown open to the public once each month, while club days have served to focus attention upon specific sectional subjects and their related museum exhibits. Cine Film programmes have proved as magnetic in their drawing power as hitherto, Mr. Bailey having well maintained his reputation for judicious selection of films bearing on the many and various aspects of Natural Science, in which the Society is interested. Attendances at Field Meetings, Coach Excursions, etc., confirm the appeal, both pleasurable and educational, of these summer exercises.

On the social side, thanks in great part to the efforts of the Entertainment and Tea Committees; the New Year Party and the Summer Garden Party proved to be happy occasions demonstrating once again their value as enjoyable and informal meeting grounds between members new and old. This year—on August 21st—the weather happily permitted of tea being served in the garden.

Representatives of our Society have, as hitherto, attended meetings of the British Association, the Council for British Archaeology, the South Eastern Union of Scientific Societies and the Hampshire Naturalists' Trust. This year Mr. W. Moore joined Mrs. Boyd Watt as its second delegate to the British Association.

In the course of last year's report, Council observed that the benefits of the advantageous sale of land in 1960 were becoming apparent. That statement has since acquired added significance. Apart from certain necessary schemes of decoration, it had long been realised that the Society might at any time be called upon to shoulder the cost of major structural repairs to the fabric of our building, now some 80 years old. Moreover, the opening out of the Entrance Hall and modernisation of the kitchen were regarded by Council as but first steps in a general improvement of amenities. Early in the year Council approved a scheme of redecoration covering the lecture hall and adjoining lobby whereby both hall and approach might be afforded a warmer and more inviting aspect. Prior to the commencement of the work, however, it was deemed advisable to invite an overall inspection of the lighting system by the Southern Electricity Board. As a result of this official survey and the recommendation issuing therefrom, modernisation of the wiring system throughout the whole building was carried out.

Of major importance, however, was the complete replacement of the Library floor, the original timber of which was in such a state as to defy repair. On professional advice this was replaced by a floor of concrete which embodies a system of thermostatically controlled under-floor heating. The original shelves, many affected by worm and damp, are being replaced by modern metal structures. Under the energetic direction of Mr. H. S. Holbrook, the Hon. Librarian, an extensive revision and re-alignment of the Library collection is being effected entailing, as will be appreciated, some concentrated planning, plus long periods of work on the premises. Council hopes and believes that members will make increasing use of the facilities soon to be available in a pleasant and comfortable setting.

In August, Mrs. Selwood, the Society's Caretaker for the past six years, resigned on grounds of ill-health. Mrs. Selwood had carried out her duties loyally and to the satisfaction of all concerned and her decision was received with regret. Advantage was taken of the interval between Mrs. Selwood's departure and the incoming of her successor to redecorate the flat and effect certain long called for improvements, work which would have been commenced earlier but for the indisposition of Mrs. Selwood and her husband.

The period between their departure and the settling in of the new caretaker was a difficult one, and here a special tribute must be paid to Mr. G. A. Shillidy, members of the House Committee and others who responded so nobly to the appeal for help. This entailed not only routine work but also the daily attendance of someone to deal with visitors, telephone calls, etc.

It will be realised that work of the character and extent of that outlined above could not have been undertaken without competent professional advice. Our debt, therefore, to Mr. Butcher, our Hon. Architect, has been immeasurably increased by reason of his services during this period. To the exceptional demands made upon his time and goodwill, involving among other things supervision of the work whilst in progress, he has responded with a readiness and friendly informality which have earned him the gratitude and esteem of those who have been associated with him.

As in former years, the professional services of our Hon. Solicitor, Mr. G. A. Turner, have been readily available whenever required. We much value his help.

In an overall expression of thanks, Council includes the Hon. Auditors, Society Officers, Chairmen of Sections, Members of Committees and all others who have so generously given of their time and labour in furthering the interests of the Society.

Obituaries.

Ernest St. John Burton.

Ernest St. John Burton, a talented geologist, artist and musician, was born at Parkstone in 1875, and was the son of Arthur Burton, also a noted Dorset musician and composer.

St. John Burton, as he was usually known, received his early training at the Brussels Conservatoire, where he specialised in the violin and piano. Eventually he joined the Bournemouth Municipal Symphony Orchestra and was for many years its leader under the conductorship of the late Sir Dan Godfrey. He composed several musical pieces, including an orchestral symphony, and in 1936 was the author of an attractive and interesting volume on "The History and Evolution of the Violin".

From his early years, however, Burton had been fascinated by the remarkable geological features exhibited in our local cliffs, and was especially attracted by the prolific and beautiful shell fauna that could be collected at that time from the vicinity of Barton-on-Sea and Hordle.

Relinquishing his professional musical work he assiduously studied the succession and fauna of the Barton clays and sands in detail over a period of several years; and the subsequent publication of his extended researches by the Geological Society of London gained for him a well-nigh international reputation. Indeed, his work still forms the basis of much of the subsequent researches on rocks of this particular geological epoch.

His interest in geology became very wide and varied and he wrote papers on the Dorset coast, the estuaries of the rivers Avon and Stour, and also on interesting sections revealed during the excavation of the Southampton Docks.

St. John Burton joined our Society in 1922 and was for many years a valued member of Council. Many older members will doubtless recall with pleasure the delightful field outings he led for many years along the cliffs and foreshore at Highcliffe, Barton

and Hordle. In 1961 he was elected an Honorary Member of the Society.

For the last twenty years of his life, Burton lived in retirement at Barton-on-Sea, and here he devoted himself largely to art, achieving the same remarkable prowess with the brush and pencil that he had already shown in music and science. A gifted artist in oils, water-colour and pastel, he exhibited at the Paris Salon and at many of the leading exhibitions in London and elsewhere. Excellent examples of his work are also on view in the Russell-Cotes Art Gallery.

St. John Burton was of a kindly and retiring disposition and, considering his remarkable achievements, a man of innate modesty, and was a truly delightful companion either in the field or in the study.

He died on March 18th last and is survived by his widow, Mrs. Beatrice Burton, and his only son, Andre St. John Burton of Seaford in Sussex.

With the exception of a collection now housed in the Tudor House Museum at Southampton, he bequeathed his wonderful collection of shells and fossils to the Natural History Museum in London, and his valuable collection of scientific books and papers to the Bournemouth Natural Science Society.

Miss Ella Ruth Banham.

On the 19th March, 1962, the Society, and especially those interested in the Botany Section, sustained a heavy loss through the death, in her 87th year, of a much respected member, Miss E. R. Banham.

From 1936, the date of her entry, Miss Banham was a leader in all Botanical and other Natural History excursions and was specially valuable in the help she gave to new members and those strange to the district. Her knowledge of the distribution of plants in our area was accurate and extensive and was invaluable during the illness of the Chairman of the Section, Mr. Beeching Hall.

Some time after the leadership of the Section was taken over by Mr. E. Chambers, there was a period of absence of the Secretary, Mr. J. Wadlow, and Miss Banham again gave unstinting help in arranging the excursions and recording the plants. Subsequently, in 1949, she became Secretary for Botany and only relinquished the post in 1955, when anno domini and failing health made it necessary and she was satisfied that other members could carry on her work.

Every colleague of Miss Banham will remember her for her kindly and unobtrusive manner and the modesty which clothed her undoubted knowledge of Natural History. In 1960 she was created an honorary member in appreciation of her work for the Society. Latterly she was unable to join in the excursions but her interest in the Society never failed—nor her friendly smile.

Reports of Sections for the year ending September 30th, 1962

Library

During the past session the Council decided to have the Library Room renovated and the books were sent to store. Steel shelving has been erected in place of the old wood shelves; also an attractive display rack for current journals and periodicals and a new cupboard have been provided. The cost of these fittings has been met by the sale of books selected by the Chairmen of Sections from the accumulated surplus for which we have no further use.

The Library Committee are grateful to two Past Presidents (Miss M. A. M. Penrose, B.Sc. 1958-59, and Mr. W. P. Winter, B.Sc. 1961-62) for donations enabling them to purchase six comfortable reading chairs for the re-furnished Library Room.

The return of books from store has commenced and their arrangement on the shelves is proceeding.

H. S. Holbrook.

Museum

Many of the Chairmen of Sections have had to work very hard whilst the alterations to the rooms and building have taken place, in re-arranging the various cabinets of collections in their respective sections.

As Hon. Curator I wish to record the thanks of the Museum Committee to the House Committee (Chairman Mr. G. A. Shillidy) for their work in clearing and sorting the vast quantity of books, cases, boxes, etc., which had accumulated in the attic and any convenient cupboards and corners. We also express our appreciation of the very dusty and arduous labour undertaken by Miss F. M. Exton and her committee in dusting the exhibits and re-arranging the cabinets, etc. Mr. F. W. Robins has arranged many interesting archaeological specimens in the Main Hall cases.

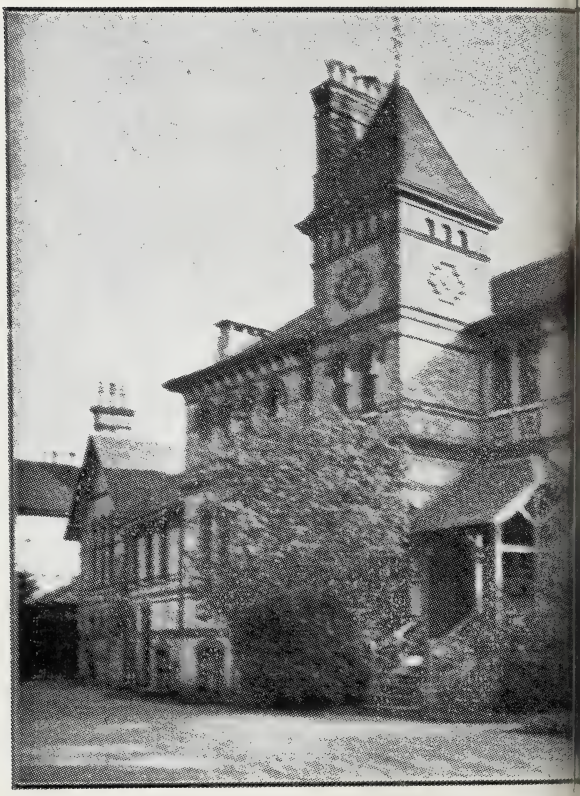
The "Bury" collection of Prehistoric Flints from the Farnham (Surrey) area were presented to the Farnham Corporation Museum.

W. L. Whittle.

Garden

The newly-arranged garden has reached the stage when it only needs maintenance and a little further development in planting ornamental shrubs and herbaceous plants. During the latter work there will be kept in mind the scheme of memorial shrubs to late members of the Society. The regular part-time employment of a gardener has been necessary as we have not been able to enlist more voluntary help by members.

Development work on the adjacent site is proceeding. The fence is erected and it is hoped that within the current year the west side of the garden will begin to reach the same mature



The Society's I—Front V

e—Front View

appearance as the east boundary beds. We have lost a few shrubs through the frosts of last winter and also due to the wind-blown lime during building operations. Members can now expect to see a garden worthy of the Society. Gift plants of special beauty and interest will still be welcomed.

WINSOME CHOME.

Archaeology and History

The past year's activities of the section commenced with a lecture by our own member, Mr. S. J. White, on "Thomas Hardy" in October. In November a very popular lecture was given by another well-known member, Mr. T. H. Bickel, on "The Golden Age of English Furniture, Chippendale and his contemporaries". Mr. Bickel is an expert on his subject and put it over to the obvious enjoyment of his audience. In December, a special Christmas lecture, "The Festive Season—Here and There" was given by the section chairman, and on December 30th, Mrs. Sephton displayed the colour photographs she had brought back from her visit to the prehistoric cave paintings at Lascaux, the chairman giving a brief account of prehistoric art in general. This led to a discussion on the possibility of arranging a party to visit the caves and, eventually, to a small party making the visit in the following September.

The January lecture was "Dorset in Colour" by Mr. Cecil Stickland, incorporating descriptions of some Dorset antiquities and views taken by the lecturer to good effect. The March lecture by Mr. Douch, of Southampton University, on "Mediaeval Southampton", illustrated by slides, was also much appreciated.

In response to a request for a winter outing, a visit was paid to Christchurch Priory on February 28th, but the bleak weather restricted the attendance.

In March another lecture was on "The History and Work of the Women Police", a breakaway from ancient into modern history, which proved extremely popular by reason of the interesting and often humorous way in which Police Sergeant Joan de Pledge dealt with her subject. She is in great demand as a lecturer.

The final lecture, on April 25th, 1962, was given by Mr. Dennis Harding on "Excavations at Pimperne, Dorset", and was illustrated by slides.

As the section chairman was to be abroad during most of May, the first excursion of the 1962 season took place at the end of April, when a visit was paid to Guildford Cathedral and Castle. The Society is grateful to the Provost for the excellent arrangements made for our reception.

The June excursion to Netley and Titchfield Abbeys and Portchester Castle also proved a popular one, and though the July excursion to Romsey and Southampton was not so well supported as usual, the Vicar of Romsey—formerly at Bournemouth—went to a lot of trouble to take the party over the Abbey and detail its history, while at Southampton, by the courtesy of the officials of the Museums and of the Old Bowling Club, members were

introduced to little-known aspects of the town, which possesses the oldest bowling green in the world.

August provided an excursion to the excavations on the recently-discovered and important Roman villa at Fishbourne, near Chichester, with a brief glimpse of the city itself. The final excursion of the season was to Farnham, where the party went to Moor Park, with its Swift associations, to Farnham Castle and to the new Farnham Museum, to which the Society has given some surplus Old Stone Age implements, and which was then staging exhibits of the section chairman's lamps and of Bohemian glass, our visit coinciding with the opening of the latter by an official of the Czech Embassy.

F. W. Robins.

Astronomy

During the past year the chairman of this section was also President of the Society, and his Inaugural Lecture on the observatories of Cambridge, England, and the Commonwealth of Australia appeared in the Proceedings of the Society for 1960-61. The President also lectured on "The Sun's Corona" on January 17th, and on "The Sun's Radiation" on May 1st, in each case dealing with modern solar research. On August 13th, he gave a talk on Club Day on "Lunar Craters and their Terrestrial Counterparts", a highly controversial subject which led to an interesting discussion.

On October 28th, Mr. W. H. Day, F.R.A.S., spoke on "The Spectrohelioscope". He had constructed one in his own private observatory and showed the extreme importance of the instrument in modern solar physics.

On February 17th, Sir Arthur Dixon, C.B., C.B.E., delivered his first lecture to the Society on the subject of his visits to the observatories of the U.S.A. His lecture was illustrated by official Palomar and Mount Wilson slides of great interest. He also stressed the abiding importance of the work of the smaller observatories, such as Yerkes.

On March 17th, Mr. A. C. Curtis, F.R.A.S., President of the Southampton Astronomical Society, lectured on "Globular Clusters" and showed that their place in the galaxy is one of increasing importance.

W. P. Winter.

Botany

The character of Bournemouth is changing rapidly, as multi-storey blocks of flats rise to replace the more gracious homes of the past with their gardens and trees, and so more people appreciate the opportunities offered by this section, of learning about the countryside. Since coach excursions are now arranged by several other sections, there were only three botanical ones during the summer, but the meetings for which public transport

was used were very numerous and varied in the types of country visited, and we are greatly indebted to the leaders and organisers of these days.

On one occasion, a visit to Buckler's Hard, we were pleased to welcome a party belonging to the Lymington Naturalists Society.

There were five lectures during the winter months and we should like to thank the lecturers for their services. Dr. Hora of Reading University again visited the Society, this time he not only gave us a most interesting lecture, but also stayed overnight and led the Fungus Foray next day!

We deeply mourn the loss of Miss Banham, who was a most active and enthusiastic member of the section. For many years she acted as secretary and her record book, most meticulously kept, is still in the library and provides a most useful basis for the planning of field meetings. Her obituary notice appears elsewhere in the Proceedings.

Plant Notes

Bromus tectorum reported at Parkstone (Proceedings 1959-60) has now disappeared and must be regarded as a Casual.

Carduus acanthoides has been seen again near the River Avon.

Gladiolus illyricus was unusually abundant in the New Forest.

Cakile maritima has appeared on Southbourne Cliffs, and is still surviving on the sand spit at Hengistbury together with *Salsola kali*.

Gaultheria shallon and *Pernettya mucronate* are continuing to spread on Hengistbury Head.

Platanthera bifolia flowered well at Holmsley.

Symphytum x uplandicum and *Lythrum hyssopifolia* both appeared on the dump at Stanpit. (Mrs. Yule).

Miss Penrose had a strange *Lythrum* in her garden which was named *L. junceum Solander,* an introduced plant from the Mediterranean.

Leucojum aestivum was found in rough, wet, meadow land, south of Ringwood.

Geranium endressii at Bickerley.

Orchis morio by the Foulford Brook.

Orchis ustulata at Martin.

Gymnadenia sub species densiflora at Rockbourne; magnificent specimens nearly 2ft. tall!

Verbascum lychnitis at Ashley Halt.

Galinsoga ciliata at Bournemouth Bus Station.

Oenothera oderata at St. Helen's, I.O.W.

Calamintha sylvatica, ten plants only surviving on a single shady bank in I.O.W. A "guardian" has been appointed by the I.O.W. Natural History Society and fencing erected. No picking is allowed. (Mr. and Mrs. Pickering).

The Hampshire Trust reports that the interesting area by the Old Iford Bridge is to be taken over as a small Nature Reserve.

The Trust has also authorised the removal of *Polygonatum oderatum* from the position threatened by the widening of the A31, to a safe place further into the Forest.

Mr. Pickering has also contributed the following notes on Fungi: —

Near Burley a species of *Clavaria* was found under a Beech tree. It was identified by Dr. Hora and Dr. Manners (Southampton University) as *Clavaria longicaulis,* a species not previously recorded in this country, but known in North America! The site has been pinpointed by the British Mycological Society.

We congratulate Mr. Pickering on this discovery!

Cordyceps militaris, the strange fungus that grows from a pupating caterpillar was found near Cadnam.

Another, rarer, species of *Cordyceps parasitic* on the false truffle, was found in the same area. This had only been previously known in Ireland.

Lactarius volemus—a specimen weighing 5½ozs. was found at Crowe Copse, Ringwood.

A. K. Hunt.

Entomology

The weather of the past year has been sufficiently variable to affect the appearance of our Lepidoptera, both Moths and Butterflies. On the infrequent sunny days there have been flights of our brighter butterflies, particularly those of the Vanessa type, accompanied by the day-flying Burnets and Cinnabar Moths.

It has been noticed that the flowers visited have been almost exclusively of the compositae type.

On the few warm evenings this summer moths have often been seen fluttering round brightly-lighted windows. On cool, cloudy evenings the light failed to attract them.

At 4 p.m. on August 30th last, several flights of ants were observed. From a nearby hedgerow a flock of birds swooped down on the ants nests and pecked vigorously at the emerging ants. After twenty minutes the flight finished and immediately the birds disappeared.

On October 21st, 1961, Colonel F. B. Scott gave a lecture on "Rare Indian Hawk Moths" which was well illustrated by lantern slides.

W. S. I. Cox.

Geography

During the last fifteen years many countries have gained their independence, most of them within the British Commonwealth of Nations. The very existence of these "new" countries depends upon their ability to pay their way and therefore upon their economic resources and the wise use of these resources. Accordingly it was thought that a course of lectures on the economic

geography of some of these areas would be of interest to members of the Society and this proved to be the case.

The lecturers and the countries they dealt with were: Mr. W. J. Evans, B.A., B.SC., F.R.G.S.—"The changing face of North Africa" and "The Bonn Region of West Germany"; Mrs. A. M. Vincent, B.A.—"The economic geography of Nigeria"; Mr. E. Chambers, F.L.S.—"The British West Indies" (illustrated by a colour film "The Bright Land"); Mr. D. T. Adams, M.A.—"Ghana and Sierra Leone"; Mr. T. H. Bickel—"A visit to Cashmere" (illustrated by lantern slides); the Chairman of the Section—"The New India" and "Pakistan".

During the Summer six field meetings were held, two of which were to the Isle of Purbeck to study physiography, in conjunction with the Geological Section.

Walks up the Bourne Valley and to Hengistbury Head showed the many points of geographical interest to be found in the immediate vicinity. A journey up the Avon Valley revealed the diverse character of this river basin—the wide flood plains of the lower course; the Woodgreen 80 feet terrace, supporting the theory of river capture; the incised meanders of the Salisbury-Upavon section; the denuded anticline of the Vale of Pewsey and the source of the river in a dry valley of the Marlborough Downs. The now-disused Avon-Kennet Canal with its warehouses, clock tower and quays at Honey Street and the "staircase" of locks west of Devizes recalled the prosperous Canal era of the nineteenth century. The last excursion was to Southampton where during a tour of the Docks, the Ocean Terminal and the George V dry dock were visited. Portsdown Hill, a ridge of chalk intruded through the younger sediments, provided a commanding position for the forts protecting Portsmouth, which is situated at the narrow entrance to a large deep water harbour, thus formerly having ideal conditions for the establishment of a naval base. In the afternoon a visit was paid to the Hambledon vineyard on the south-east facing slope of the chalk downs, in a position somewhat similar to that of the Champagne vineyards of Northern France. After tea at the small yachting centre of Warsash, on the River Hamble, the departure down Southampton Water of two of the liners, seen in dock earlier, brought to a close a day of varied interest.

F. M. EXTON.

Geology

The passing of Mr. St. J. Burton in March last, who had been a member of our Society for the past forty years, was a severe loss to the Geological Section, for we all greatly appreciated his valued guidance on many of our field outings.

In the past session there were four lectures. The Chairman of the Section gave an illustrated talk on waterfalls, while Professor Hodson of Southampton University gave us a most fascinating and popular lecture on "Measuring the Age of the Earth". In February, Mr. H. A. Hayward described the geology

and scenery of numerous tropical and sub-tropical places he had visited during a recent extended tour to Australia; while in March Mr. Ian West gave us an illustrated and interesting account of the Purbeck region, and in particular of Durlston Bay, where he had been carrying out some important researches on the breccias and other rocks associated with them in that district.

The three field meetings of the past session were all well attended and proved as popular as ever. In May, we went by coach to Portland to examine the Chesil Beach and the remarkable geological features to be seen at the Bill. We also visited some of the world-famous quarries in Portland Stone, and are much indebted to the Bath and Portland Stone Co. for granting us such excellent facilities for seeing the extraction and treatment of the famous Portland Freestone.

In June we had a joint outing in private cars with the Geography Section, and were able to visit such usually inaccessible places as Creech Barrow, Kimmeridge Bay and Swyre Head. We are much indebted to those who were so kind as to place their cars at the disposal of the members.

In September we made a tour of the Isle of Purbeck by coach and among the places we visited were Durlston Bay, Peveril Point and Winspit. This enabled members to collect specimens of Purbeck marble and other characteristic rocks and fossils of this interesting region.

D. A. Wray.

Microscopy

The lecture season was opened by the chairman of the section with slides in colour dealing with the use of the microscope in Geology, Botany, Entomology and Photography. He emphasised that Microscopy was used in all our sections and hoped to obtain lecturers to deal with each of the subjects in turn.

The response was excellent, but details of the lectures to be given after September must be left over for next year's report.

Not many of our members have availed themselves of the use of our microscopes, and it is hoped that they will do so later.

Our micro-projector has been overhauled and we can now project direct from micro-slides.

A. J. Aiers.

Photography

All lectures were very well attended during the session. The popularity of 35 mm. colour transparencies is proved by the fact that each of the nine lectures given was illustrated by this means.

The season commenced with "Kaleidoscope", in which Mrs. M. Crawshaw, Miss F. M. Exton, B.A., Mrs. H. M. Sykes and Mr. T. H. Bickel showed their slides of varying subjects.

Sunshine was brought into a grey November day with Mr. Nigel Spinks' colourful pictures of "Romantic Cyprus", the results of several months' sojourn there, during and after the trouble.

The following month we saw some beautiful slides of "The Enchanted Country—Land of the '45", with an interesting talk by the lecturer, Mr. H. L. Christie. Nearer home, "In and Around the New Forest" through the camera lens of Mr. W. G. Lee, opened our eyes to its hidden aspects of beauty throughout the seasons.

The last three lecturers were all new to the Society, and very welcome. We were glad to see Mr. G. Holroyd on the platform with his results of "A Visit to the Isle of Man". These were Agfacolor transparencies. Miss U. Ogle showed Scottish slides—"By Lochaber I will Go". This was in place of Mr. Dudley, whose lecture was unavoidably postponed. The instructional lecture was "The Mysteries of Photography Exposed", ably explained by Mr. G. Tandy, who also showed some slides. He made a welcome return visit and this talk was given in answer to several requests. Mr. A. J. Butcher, F.R.I.B.A., depicted the colourful aspects of "A Mediterranean Cruise". Finally, our season came to a close with Mr. D. J. Dudley's postponed "The Highlands through the Seasons". This was again beautifully presented with the lecturer's tape recordings of voice, music and Scottish songs, all blended into one harmonious whole. This lecture was open to the public free of charge.

Worthy of note is the great improvement in modern 35 mm. projectors, which is perhaps the reason for so many of our lecturers bringing their own, whereas a poor transparency will look better through a good projector, a good one deserves perfect presentation.

Again the Society's thanks are tendered to all lecturers and especially to Mr. Holroyd for all his hard work on the projection side.

Any suggestions from members regarding future programmes would be welcomed, especially new volunteers for Kaleidoscope.

URSULA OGLE.

Physics and Chemistry

"The New Chemistry" was the title of a book published several years ago by Professor Andrade, in which he dealt with a number of experimental observations (now familiar to every student of University-entrance grade) made in nuclear resarch, especially in the study of the bombardment of atomic nuclei by subatomic projectiles.

Much more recently the same title has been used by a group of chemists to describe some of the fascinating theoretical and applied developments achieved in numerous departments of Chemistry during the last few years. This book, published under the auspices of "The Scientific American", served as the chief source for two lectures by the writer: the second of these belongs to the Society's year 1961-62.

In his Presidential Address (Proceedings, Vol. XLIII, p.49) the writer referred to the minutest and last-discovered of the particles operating within the nucleus of an atom, the neutrino,

which surely must be the link between matter and energy: a particle theoretically predicted and now the subject of costly research proceeding in America: a particle with no detectable mass, with a life span of inconceivable brevity, and with powers of penetration through matter far exceeding that of cosmic radiation.

In the neutrino we may have reached the ultimate of detectable size, and it may have been appropriate that some attention by this Section was directed during the period now under review to the influence and importance of small quantities of chemical reactants, more especially in their biochemical relations to botany and agriculture and to animal physiology and medicine. Three lectures were devoted to this subject matter—a general discussion on traces and small quantities, and separate contributions on vitamins and hormones. Much of the recent progress made in these branches would have been impossible in the absence of brilliant developments in chemical micro-analysis and in the application to chemical needs of physical techniques and apparatus in spectroscopy, electronics and magneto-electricity.

The space rivalry between East and West has undoubtedly led to the suppression by both sides of material which, when eventually disclosed, will be of vast public importance for the future. But there have been compensations, some of them actually stemming from the rival display-mechanisms of the great nuclear powers, rather than from any desire on the part of either to spread knowledge and know-how for the benefit of the world at large.

All the same, scientists everywhere would gladly welcome some further substantial contribution of new knowledge gained during the I.G.Y. of 1957-58 in which so many nations co-operated and which raised such high hopes for future peace.

HERBERT E. CLARKE.

Zoology

After the consistently favourable weather conditions noted in previous years it should be recorded that on December 5th, 1961 the Meeting at Poole Harbour had to be abandoned because of the severe gale; the first time since 1957.

During the year the Group has welcomed both keen new members, and others more knowledgeable, to the friendly atmosphere of the Field Meetings. The Reading Circle for the authoritative journal "British Birds" continues, and now has 10 subscribing members. At the end of each year the twelve issues are presented to the Society Library and bound as one volume for use by anyone who may be interested. The Group Diary of the Field Meetings has again been carefully kept throughout the year.

A marked meteorological feature of this year was the lateness of Spring and early Summer. Persistent northerly winds, and the sub-normal temperature stimulated conversational cliché but also caused the biggest hold-up of Spring migration of recent years. Foliage was long delayed, and when our southern migrants did arrive they found insect food short. Song and nesting were late

and this whole sequence resulted in some Spring Meetings being less interesting than is usual. By June, however, Kingston was alive with Whitethroats, and the banks of the Stour with Sedge and Reed Warblers and Yellow Wagtails, while at dusk on May 28th the Nightjar was again 'churring' on the writer's roof.

A visit to The Zoo, Regent's Park, occupied the whole of a fine day on May 15th. Here indeed was there no lack of rare and interesting studies at close quarters; and many of the impressive and beautiful animals seen are saved from extinction only by being scientifically cared for and bred in Zoo paddocks and enclosures. A pleasant, enjoyable excursion throughout.

During its season Stanpit had fewer Curlew and smaller flocks of Dunlin, but there were increased numbers of Turnstones, Ringed Plover and Yellow Wagtails. On September 24th, Grey Plover (seen there for the first time) and Whimbrel were present; and on February 15th there was the unusual simultaneous view of a Red-throated Diver in the river channel and 2 Siskins feeding among the debris left along the high water mark.

Any duck on Littlesea nowadays are usually hidden by the increasing reed growth, but on February 1st over 400 Pochard were watched for twenty minutes. Whitefront Geese and a varied collection of duck were again present on flooded meadows in the Avon Valley in February.

An interesting season on the whole.

H. V. Harris.

Cine Film Subscription Programmes

The interest of members in these programmes was well maintained during the winter season 1961-62. The attendance varied between 112 and 167, and the average was 131. The Season Subscription was paid by 75 members.

Seven programmes were given during the season and 28 films were shown—23 in colour and 5 in black and white. The subjects were kept well within the range of the Society's activities and every effort was made to show films to illustrate the work of as many sections as possible. During the season under review the result was: Archaeology and History 2; Botany 2; Geography—Home 5, Abroad 8; Geology 1; Zoology 8; and Industry 2. Many of the films, especially under Geography and Zoology, include items of interest to other sections.

Our thanks are due to Mr. D. J. Dudley and Mrs. I. Sewell for the skilful manner in which the films were projected; to Messrs. W. Moore, G. S. Locke and G. A. Shillidy for assistance in the Hall; and to Mrs. W. Boyd Watt, Mr. W. Moore and Mr. E. T. Wood for suggesting films which may be suitable for our use.

Suggestions of films which may be suitable for our programmes will be welcomed if accompanied by particulars as to where they may be obtained on hire.

J. H. Bailey.

Club Days

The attendances at these monthly meetings varied from 30 to 80.

At the October meeting, reports on the Annual Meeting of the British Association for the Advancement of Science held at Norwich in 1961 were made by Mrs. W. Boyd Watt, Miss M. Kirke, Mrs. D. K. Hards, Mrs. I. A. Fiddes, Rev. G. S. Reakes and Mr. G. Holroyd.

On December 13th, Mr. Holroyd described the Colour Television projection used at the Norwich meeting.

Other subjects discussed during the year were: The Library; Moon and Earth; India (by Mr. Shillidy); Space Travel and Rockets; Geographical Excursions (by Miss F. M. Exton); The Museum; and The National Trust.

On June 13th, Mrs. A. K. Hunt conducted the members round the garden. Appreciation of the work done by Mrs. Chomé and her helpers were voiced.

Thanks are due to the many members whose suggestions and advice are always welcome.

W. L. Whittle.

Bournemouth Natural Science Society

List of Presidents (1903–1963)

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1933—34	Rev. F. C. R. Jourdain, M.A., F.Z.S., M.B.O.U.
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1935—36	Henry Bury, M.A., F.L.S., F.G.S.
1936—37	Sir Harold Carpenter, M.A., D.SC., F.R.S.
1937—38	Professor John Cameron, M.D., D.SC., F.R.S.E.
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1940—41	Rev. Professor M. C. Potter, M.A., D.SC., F.L.S.
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1945—46	J. F. N. Green, B.A., F.G.S.
1946—47	Lt.-Col. G. C. Drew, D.S.O., F.S.A.
1947—48	W. J. Woodhouse, A.C.P.
1948—49	Dr. Edward Hindle, M.A., D.SC., F.R.S., F.Z.S.
1949—50	Mrs. Boyd Watt, F.Z.S., M.B.O.U.
1950—51	Professor Sir R. A. Peters, M.C., M.A., M.D., F.R.S.
1951—52	Ernest Chambers, F.L.S.
1952—53	F. Williamson, F.R.Hist.S.
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1957—58	Dr. D. A. Wray, M.SC., F.G.S.
1958—59	Miss M. A. M. Penrose, B.SC.
1959—60	Miss D. M. Lowther, B.SC.
1960—61	James Fisher, M.A., F.L.S., F.Z.S.
1961—62	W. P. Winter, B.SC.
1962—63	Dr. F. H. Perring, M.A., Ph.D.

Presidential Address

The Irish Problem

by F. H. Perring, M.A., Ph.D.

(Delivered before the Society on the 17th November, 1962)

When I last had the pleasure of addressing you I gave a preliminary account of some of the fascinating correlations between plant distributions and climate and geology, for example, which had been thrown up by the work done in preparing maps for the ATLAS OF THE BRITISH FLORA. At the same time I believe I finished my lecture with a warning to this effect: "that the ATLAS was no place in which to attempt an analysis. A proper analysis would need much thought and experiment in years to come. The ATLAS is only a starting point for further studies: a pointer to the most fruitful lines of research."

It was with this in mind that I chose to talk to you this afternoon on the problem of the Irish Flora. It is a problem which has long engaged the attention of British phytogeographers. At its simplest it can be defined as why, on the one hand, there are a number of species occurring in Ireland which do not occur in Great Britain and why, on the other hand, there are many more species which are absent from Ireland which do occur in Great Britain.

In the past Praeger (1934), for example, has argued that these differences are mainly due to historical factors: that the species only found in Ireland are the remnants of once more widespread distributions which have been broken up by climatic changes in the Post-glacial: that many species not found in Ireland are absent because the sea became a barrier to migration before the species were able to establish themselves in that country.

What the new evidence produced by the ATLAS, and some recent palaeo-botanical studies suggest, is that whilst the old hypotheses remain tenable in a number of cases, historical factors do not necessarily need to be cited in all. For ease of reference the Irish species absent from Britain have usually been divided into three groups, the Hiberno-American, the Lusitanian and a third which we may label "Continental". And for a better understanding of these groups it is usual to include with the exclusively Irish species others which, though they do occur in Britain, have similar distributions to the exclusively Irish species outside the British Isles. I shall examine species of each of these groups in detail.

The Hiberno-American Group

(a) *Najas flexilis*
Eriocaulon septangulare
Hypericum canadense

(b) *Spiranthes romanzoffiana*
Sisyrinchium bermudiana
Juncus tenuis

The evidence now available suggests though these six species all have their centres of distribution in N. America and that though historical factors have determined their apparently relict distribution in Europe today, they fall into two distinct groups with different histories.

Group (a) (i) *Najas flexilis*—Watts (1959) says "It has now been recorded very often from Interglacial and Post-glacial deposits. The completeness of the record makes it virtually certain that the species has occupied stations in various parts of Europe throughout the Quaternary. At present the species is widespread throughout North America, and has a few scattered stations in northern Europe and the British Isles. Abundant Post-glacial fossil finds show that its present rarity in Europe is the result of a drastic reduction in range since Boreal times. There is no longer any reason to include this species in the "Hiberno-American plant-geographical group."

Jessen *et al* (1959) and Watts (1959) both report this species from deposits of the Hoxnian Interglacial (the one before last) in South and West Ireland, and there are four records from the Ipswichian Interglacial (the last) in S.E. England.

(ii) *Eriocaulon septangulare*. This species, unlike *Najas*, does not occur in Europe outside the British Isles today nor have fossil remains been found outside our Islands. It was originally supposed that this species must have spread from North America in the late glacial. But two recent discoveries make this theory untenable:

(i) Löve and Löve (1958) have reported 2 chromosome races of *Eriocaulon* — American 2n = 32 — European 2n = 64.

(ii) *Eriocaulon* fossil pollen has been found in 2 Irish interglacial deposits. Comparing the pollen size of today c.31 μ (range 28-36 μ) Irish, c.24 μ (range 21-28 μ) American with the fossil size mean 32 μ (range 26-38 μ) strongly suggests that the European stock is ancient and differs from the American.

That *Eriocaulon* is confined to west coast areas in the British Isles today can hardly be because of climatic considerations. The associated species in Interglacial deposits included *Elatine hexandra, Pilularia globulifera, Littorella lacustris, Isoetes lacustris, Myriophyllum alterniflorum, Potamogeton natans* and *Nitella* ssp. This group suggests a cold climate comparable to the Late-glacial, and the associated diatom flora of the deposit is similar to that found in central Scandinavia today. It is known that *Eriocaulon* is not frost sensitive. The American populations withstand severe winters in the mid-west and St. Lawrence areas, and Matthews (1946) has reared British material successfully out of doors at Aberdeen which has winters considerably more severe than those of the west coast.

Watts (1959) suggests that the species is probably restricted to the oceanic west for edaphic reasons for here only have open calcifuge habitats existed throughout the glacial period, here where the leaching rate is rapid.

It seems likely that both these species have survived the Pleistocene glaciations in Ireland and it is perhaps reasonable to include the third species *Hypericum canadense* with them. It was first discovered in Connemara in 1954, and two distinct localities 6 miles apart are known. It was recorded in the same year from the Vosges of eastern France where it occurs on the gravel shores of peaty lakelets; but the species was collected as early as 1904 from a heath at Almelo in eastern Holland. Webb (1958), describing the habitat of the species in western Ireland, says it is most at home in very wet conditions and that it requires a peaty, or at least base-poor soil. Associated species included *Hypericum elodes, Anagallis tenella, Juncus acutiflorus, J. kochii, Carex panicea, C. demissa, Molinia caerulea, Eleocharis multicaulis, Ranunculus flammula, Hydrocotyle vulgaris.*

This species, like *Najas* and *Eriocaulon,* grows in wet acid conditions; its occurence in central Newfoundland suggests that it is not frost sensitive; since it was first discovered in Europe in 1904 it has shown no signs of spreading—yet the three isolated occurrences are all in rather similar ecological sites which can hardly be due to chance introduction. The most satisfactory interpretation is that *Hypericum canadense* is a relic and that, with *Najas* and *Eriocaulon,* it survived the Pleistocene in Ireland.

Group (b) contains the other three species: *Juncus tenuis, Spiranthes romanzoffiana, Sisyrinchium bermudiana.*

(i) *Juncus tenuis.* Though this species is generally placed in the Hiberno-American element it was first recorded in the British Isles from Scotland in 1795 or 1796 by G. Don "by the side of a rivulet in marshy ground amongst the mountains of Angusshire". Though material to support this record exists in many herbaria, the habitat and altitude are not typical and the locality has never been refound. For these reasons, and because of Don's unreliability in other matters, this record is usually disregarded. Even if we ignore this record though, the first British records are not from Ireland. They are:

Before 1844 'Perthshire'.
1863 between Bridge of Weir and Kilmalcolm, Renfrewshire.
1884 Gradley, Herefordshire.
1886 New Galloway, Kirkcudbright.

The first Irish record was not until 1889, when it was found by Scully in two places in County Kerry (Scully, 1889), i.e., at least 45 years after it was first reliably recorded in Great Britain. A year later the species was recorded for the first time in Wales, from Caernarvonshire.

From each of these centres of early records, with the exception of the Herefordshire one, spread seems to have taken place, as well as from other later centres, e.g., Devon and Cornwall, South Wales, Lancashire, Surrey and County Wicklow. This pattern of spread is very similar to that for known introductions, e.g., *Cardaria draba* and *Senecio squalidus,* i.e., a number of early scattered records, apparently unconnected, followed by spread from these centres. There is a certain amount of reasonable speculation about the method of introduction, particularly in west Scotland: both the 1896 record from Arisaig and the 1912 record from Glen Ogle are attributed to the introduction of hay from America. It is suggested that viable seeds dropped from carts and, from what is known of the ecology of the species, the cart ruts left behind would be an ideal habitat for establishment.

Is there any reason to regard the south-west Irish localities as being of different status to the rest of Britain where introduction is certain? The situation here differs in that when first found in Kerry the species was already widespread and well established in very native-looking habitats far from human habitation. That it was widespread when first found can be answered by supposing that it was perhaps introduced quite a considerable time before it was noticed (Scully was the first to make a thorough investigation of the region). 'Native-looking' is a very subjective phrase—and exactly the same might be said of *Epilobium nerterioides,* a recent arrival from New Zealand which competes with the native Saxifrages on Brandon in Kerry, though it is more commonly a species of open habitats, scree, river shingle, etc., in Scotland. The distribution patterns of both *Juncus* and *Epilobium* now compare very favourably with that of an undoubted native species, *Drosera rotundifolia* (see Perring and Walters, 1962).

Since the first stages *Juncus tenuis* has continued to spread at a rate which over the first 80-90 years was approximately equal to doubling the number of 10-km. squares every 10 years. This rate of spread is of the same order as that of *Senecio squalidus,* the history of which in the British Isles has been studied in detail by Kent (1956, 1960).

Furthermore *Juncus tenuis* has a long history of introduction in Europe, much of which predates its first discovery in the British Isles. It was known from the province of Antwerp, Belgium, in 1824, from the province of Utrecht, Holland, in 1825, and from Bavarian Swabia in 1834. By 1906 it was already scattered over almost the whole of Germany and was abundant especially in the north-west German plain and in Oberlausitz (see Richards, 1943). It is now known from almost every country of Europe.

As the evidence stands at present, and in the absence of any fossil records, there seems to be no case for including *Juncus tenuis* in a Hiberno-American Element. It is more reasonable to suppose it to be a widespread human introduction from North America.

(ii) *Spiranthes romanzoffiana.* The absence of fossil records of an

orchid can hardly be significant. But, like *Juncus tenuis, Spiranthes* does have a long history as a spreading species in Britain. The first record dates from West Cork in 1810 and the next in 1873 was from the same vice-county. It was noticed in Northern Ireland in 1892 on the shores of L. Neagh in County Armagh. It has apparently spread from both these centres of origin and has in recent years been recorded on the Scottish mainland and islands, in Devon in south-west England, and in central Ireland in County Galway where Mrs. Hunt discovered it in 1958. Though Orchids are notoriously sporadic in their occurrence and though its present centres of distribution in the British Isles are not those most intensively studied, it is difficult to believe that this is not actually a spreading species adapted by its light seeds for long distance dispersal and it seems reasonable to suppose that *Spiranthes* may be a recent, natural, introduction, by seed, from North America.

The rate of spread is much slower than that of *Juncus tenuis*, but there is still a fairly consistent rate of increase in the number of squares, which is equivalent approximately to doubling the known number of 10-km. square records every 30 years (as against every 10 years for *J. tenuis*).

(iii) *Sisyrinchium bermudiana.* This species is at present being studied cytologically in Professor Valentine's department in Durham. It is possible that more than one taxon is involved. Thus it would be better to await the outcome of this work before considering it much further. The facts as known now are that there are no fossil records; that it was first recorded in Ireland in 1846 but not until 1882 in Kerry which is clearly the headquarters of the species; that it is a spreading species recorded from about 60 localities in Great Britain where it has never been regarded as anything but an introduction, though often established in native-looking vegetation; that it has spread similarly in other countries of Europe, e.g., Germany and France, and has also been recorded in Queensland, Australia.

To sum up, the so-called Hiberno-American Group consists of species of two distinct types. Three of ancient origin representing the relics of a once much wider distribution in Europe and the presence of which in western Europe is no more difficult to understand than that of more widespread species, e.g., *Lobelia dortmanna,* common to both continents: and three spreading species all of which have become more abundant since they were first recorded in the 19th century, and two of which, *Juncus* and *Sisyrinchium,* have behaved very similarly on the continent of Europe.

The lack of significance of the Hiberno-American Group is perhaps most clearly understood when it is realised that none of the six species is confined to Ireland in Europe.

The Lusitanian element

A second group of species in the Irish Flora which has long been recognised is that which consists of species which are only,

or mainly, found in Ireland in the British Isles, particularly in the south and west of that country, and the main centre of distribution of which is found along the Atlantic seaboard of Europe and into the Mediterranean. The element as generally recognised (cf. Praeger, 1934) includes 15 species, one of which, *Erica ciliaris*, does not now occur in Ireland, but which, for reasons to be explained later, has to be considered with the others.

If one compares the distribution of this group as a whole with the winter temperature, for example the January mean isotherms, it is easy to come to the conclusion that the group is limited in Ireland and Britain to areas with temperatures above 5°C (41°F) and that the spread of these species east and north is restricted because the winter temperatures in those areas are too low. That this is true for one or two of the species in the group cannot be denied. Sealy & Webb (1950) have shown that throughout its range *Arbutus unedo* is limited in the north and east by January mean temperatures of 4.5°C (40°F) and that in cultivation, for example in the London area, the tree is killed by persistent frosts of −10°C (14°F) and that fruit production is severely limited by low winter temperatures.

These facts suggest that species of the Lusitanian element occur today in Ireland at the limits of their climatic range and that a very slight deterioration would "eliminate the area completely within which these species can survive" (cf. Heslop Harrison 1953).

Recent calculations of climatic conditions during the Pleistocene are given by Manley (1951): he suggests that the most favourable conditions at the glacial maximum in Kerry were July mean 9°C (48°F) January mean −0.5°C (31°F). From this it follows that species like *Arbutus* could not have survived the glacial period *in situ* in Ireland and must therefore have immigrated in Post-glacial times. From this it is easy to assume that, because of the similarities of the distribution of these species with the other species in the group, the arguments which seem perfectly satisfactory for some members of the group must apply to the group as a whole. I believe that those who follow this line of argument are making a fatal mistake. If we are to understand the Lusitanian element we must stop thinking of it as a natural group but consider each species in as much detail as possible. Not all the facts one would like to have are yet available but some recent studies are relevant. The situation is summarised in Table I. If we consider the distribution outside Ireland of the 14 species of the group (excluding *Erica ciliaris*) we find that four of the species *Euphorbia peplis, Sibthorpia europea, Pinguicula lusitanica* and *Erica vagans* occur today in England, Brittany, western France and Spain or Portugal, and to these we may add *Simethis planifolia* at one time regarded as native in England within a mile or two of the centre of Bournemouth. Their distribution is not disjunct to any marked degree and a Post-glacial migration route can be suggested for them. Their present restriction is probably due to the changes which have taken

place in the climate since the Post-glacial climatic optimum (which may well have differed for different species). Thus *Euphorbia peplis* was probably more widespread when the summer temperatures were at their highest during the Boreal (Zone VI), whereas *Pinguicula lusitanica* would have been most favoured by the wetter conditions of the Atlantic period (Zone VII). These five species are also in the main lowland plants, not found above 580m., though both *Sibthorpia* and *Pinguicula lusitanica* occur in mountain areas where higher altitudes are available.

The lowland habitats of these plants, the obvious migration route coupled with the lack of any fossil record suggests that these species probably were not in Ireland during the last glaciation or during the Pleistocene period. To these five it seems reasonable to add *Arbutus unedo*. Its inability to survive severe frosts is known and its absence as a native from south-west England may be a recent historical accident.

In contrast to these six species there is a group of five, *Daboecia cantabrica, Erica mackaiana, Pinguicula grandiflora, Saxifraga hirsuta,* and *S. spathularis,* which show marked disjunctions between their localities in Ireland and the nearest localities on the mainland of Europe. None occurs in England or Brittany, only *Daboecia* is recorded from France north of the Pyrenees, the rest are first found in northern Spain or Portugal. Moreover the group as a whole is much more montane in character. The last three are all found at high altitudes in the Kerry Mountains where January mean temperatures are probably about −3°C (26°F), and the first two are known not to be frost sensitive. Woodell (1958) says that *Daboecia* is not growing at its climatic limit in Ireland today. It has survived temperatures of −14.4°C (6°F) in Durham though this caused a failure of seed production. However the plant is well able to reproduce vegetatively. *Erica mackaiana* (see Webb, 1955) has survived fairly severe frosts in Dublin and in Kew. Further, recent work by Jessen *et al* (1959) and Watts (1959) has shown that these two frost resistant species were in Ireland during the Pleistocene. *Daboecia* was found in deposits of the Hoxnian Interglacial at Gort, Galway and at Kilbeg in Co. Waterford. *Erica mackaiana* occurred with it at the latter site. At both sites remains of *Eriocaulon* and *Najas flexilis* were also discovered and as has been said earlier, the associated species, particularly the diatoms suggested a climate at that time comparable with that found in central Sweden today where the January mean temperatures are below −10°C (14°F). *Erica mackaiana* has also been found in Post-glacial deposits in Co. Galway in Zones VII-VIIa, not far from the localities in which it is found today.

It is now believed (see Watts 1959) that much of Ireland south of a line from the Dingle Peninsula to the Galtee mountains on the borders of Counties Cork, Limerick and Tipperary has never been glaciated, though there were local areas of glaciation in the Cork and Kerry mountains. There was thus a large area which remained unglaciated and where the January mean temperatures at sea level

were about −0.5°C (31°F) at their lowest. We have seen that *Daboecia* and *Erica mackaiana* were in Ireland in the Interglacial period when, in the south-east at least the January mean temperatures may have been as low as −10°C (14°F). The three mountain species of which fossil material has not yet been found are not apparently frost sensitive and are growing at altitudes in Kerry today where the January mean temperature may be c. −3°C (26°F). All this suggests that there is no strong argument against the survival of these five species in Ireland during the glacial period: moreover the lack of obvious connecting links with their nearest stations in western France, Spain or Portugal is much better understood if the break up of once more widespread distributions is considered to be of long standing. To this group can now be added the three from the Hiberno-American element *Najas, Eriocaulon* and *Hypericum canadense* to form a more natural association of relicts, all apparently frost resistant calcifuge species demanding high humidity and all prevented for a variety of reasons from spreading outward naturally from their present centres of distribution. Constant high humidity may in fact be the key to the persistence of these species on the Atlantic fringe of western Europe, cf. West (1961) who says "the 'Lusitanian' element in the flora is an ancient one, dating back to the Hoxnian at least, and very probably back to the Pliocene or earlier, when oceanic conditions of climate were widespread in north-west Europe".

Four species in the table have still to be mentioned which do not fit satisfactorily into either of the two groups within the Lusitanian element. *Erica mediterranea* is a plant of wet boggy ground, Praeger (1934), particularly the edges of streamlets and lakes and it occurs only in Galway and W. Mayo, strongly isolated from its nearest localities in south-west France. This suggests an affinity with the group of species which survived the Pleistocene glaciations. However its early flowering, which often commences in January, and its low altitudinal limit suggest that it is susceptible to frost which makes a theory of per-glacial survival less easy to maintain.

Neotinea intacta is a plant of bare limestones, and though ground (Praeger, 1934), particularly the edges of streamlets and October, can withstand hard frost, it is essentially a Mediterranean species in Europe, Ireland representing a remarkable outlier. If however the absence of one or two localities in western France can be overlooked its calcicolous nature and low altitudinal limit suggest a similar history to *Arbutus unedo,* i.e., a species which reached Ireland during the Boreal when summer temperatures were higher than they are today. Reductions in populations of wind dispersed species are often dramatic, e.g., *Orobanche rapum-genistae, Orchis militaris,* etc. Long distance dispersal is always a probability in the distribution of orchids and *Neotinea* may be no exception.

Euphorbia hyberna presents another anomolous case. It does occur in south-west England in two isolated localities but is absent from Brittany. It reaches an altitude of 600m. in western Ireland—higher than any of the five species in the group which are recent arrivals and it occurs at 2,000m. in Europe which is similar to the altitude reached by *Pinguicula grandiflora.* Evidence has just been produced however that fossil remains of this species have been found in the Hoxnian Interglacial deposits of eastern England which strongly suggest it belongs to the group which has survived the Pleistocene period in Ireland.

Finally a few words about *Erica ciliaris.* This species does not occur in Ireland today, but is locally abundant in Cornwall and Dorset. From its present distribution outside and its rather low altitudinal limit it would appear to fit into the group of species which were not in Britain during the glacial period. Yet material of *Erica ciliaris* has been found by Jessen *et al* (1959) in the Gort Interglacial deposit. It is possible that it did not survive the later glaciations in Ireland and that its present distribution reflects a readvance after the last retreat of the ice.

The Continental element

The third group of species occurring in Ireland but not in Britain is the Continental one and includes only two species *Inula salicina* and *Euphrasia salisburgensis.* Both are calcicolous species and it is now clear that they represent extreme examples of a tendency which can be seen in other species having similar ecological requirements. Both occur in central Ireland where the underlying rocks are calcareous and where the most continental climate of the island occurs. Amongst aquatic and semi-aquatic species we find that *Sagittaria sagittifolia, Hydrocharis morsus-ranae, Butomus umbellatus* and *Carex pseudocyperus,* for example, occur in southern and eastern England and in central Ireland and appear to be limited by July mean temperatures below 14.4°C (59°F) and February minimum temperatures above 2.8°C (37°F). Distribution of species of this kind would be reduced by increasing oceanicity, increasing podsolization, development of forests, and drainage due to human activity. This has clearly been responsible for the now relict distribution patterns of such species as *Viola stagnina* and *Teucrium scordium* both of which have a few localities in eastern England and central Ireland today. The wet calcareous habitat of *Teucrium scordium* is very similar to that in which *Inula salicina* occurs. The evidence strongly suggests that *Inula* has become extinct during the Post-glacial in eastern and central England.

Euphrasia salisburgensis has been listed by Braun-Blanquet and Tuxen (1952) from Ben Bulben in Co. Sligo and was placed in the *Seslerietalia caeruleae.* Though the evidence is not conclusive *Euphrasia salisburgensis* or hybrid material probably does occur, or has occurred recently, in the Craven district of north-west Yorkshire. The distributions of *Sesleria* and *Euphrasia* in Ireland today are almost identical and in Britain *Sesleria* has two

main centres, one on the limestones of northern England, which includes the Craven area, and another on the base rich mica-schist mountains of central Scotland. Thus it appears likely that *Euphrasia salisburgensis* has been more widespread in Britain since the last glaciation, but has subsequently been reduced by competition and now remains only on the western limestones of Ireland. In this respect its history resembles that of many other continental species in the British flora which have relect populations on areas of hard limestones or other basic rocks in the west, for example *Carex digitata, Veronica spicata, Senecio integrifolius, Linosyris vulgaris, Hypochoeris maculata, Viola rupestris, Viscaria vulgaris, Astragalus danicus, Filipendula vulgaris, Potentilla fruticosa, Alchemilla minor.* These last four all occur in western Ireland today although in the case of the two which are widespread in Great Britain (*Astragalus* and *Filipendula*) it is clear that their main centres of distribution are in the more 'Continental' eastern half of the country.

A fuller account of these species and others with similar disjunct distributions and ecological requirements has been given by Pigott and Walters (1954). Their analysis may be summarised as follows: —

1. That many species achieved a wide and more or less continuous distribution in the British Isles in the Late-glacial period, preceding the spread of the Boreal birch-pine and Atlantic deciduous forest, and have since been eliminated by forest (and bog) competition and the natural sequence of soil development from all areas save those with a peculiarly favourable set of ecological conditions.
2. That some of the species have been unable to take advantage of any recent increase in the area ecologically suitable to them; whilst others have not been so limited.

It needs to be added that western Ireland, where fossil evidence suggests that forest development was very much slower than in Great Britain (see Godwin, 1956), where high winds and exposure limit tree growth even today, and where large areas of hard limestones occur, was a very likely area in which those species of open habitats, intolerant of shade and low pH, could survive.

Summary

Consideration of these three elements in the Irish flora emphasises how misleading it can be to arrange into groups, species with similar distribution patterns and to then assume that these patterns are all the result of similar forces. The Hiberno-American is the most misleading of the three. Some of the species have arrived in Europe during the last 150 years, others are of very ancient origin and have probably persisted in Ireland since the Pliocene. These species probably have a similar history to some of those placed in the Lusitanian element which, it is now clear, also consists of two groups of species with very different histories:

those which may have survived since the Pliocene and whose distribution today is not limited by climate and others which have reached Ireland during the Post-glacial for which present day temperatures and humidity offer a reasonable explanation of their distribution patterns—e.g. *Pinguicula lusitanica.*

Lastly the small 'Continental' element is seen to be only a special case of a more widespread problem which can only be understood if other species in the flora of the British Isles as a whole are considered.

The west of Ireland today experiences the most oceanic climate in Europe. It has to be realised that, relatively speaking, this factor has been of importance throughout the Pleistocene and is probably the key to understanding the presence there now of the fascinating assemblage of species which have been the subject of this paper.

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TABLE I

	England	Brittany	West France	Spain or Portugal	Altitude W. Ireland	Altitude S.W. Europe	Irish Inter-Glacial	Irish Post Glacial	Frost Sensitive
Euphorbia peplis	+	+	+	+	Sea level	Sea level	—	—	?
Sibthorpia europaea	+	+	+	+	580 m	Lowland	—	—	?
Pinguicula lusitanica	+	+	+	+	500 m	300 m	—	—	?
Erica vagans	+	+	+	+	50 m	1,800 m	—	—	?
Simethis planifolia	—	+	+	+	130 m	Lowland	—	—	?
Arbutus unedo	—	+	+	+	225 m	1,200 m	—	—	+
Erica mediterranea	—	—	+	+	300 m	Lowland	—	—	?
Neotinea intacta	—	—	—	+	330 m	Lowland	—	—	—
Euphorbia hyberna	+	—	+	+	600 m	2,000 m	+	—	+
Daboecia cantabrica	—	—	+	+	580 m	1,312 m	+	—	—
Erica mackaiana	—	—	—	+	200 m	1,680 m	+	+	—
Pinguicula grandiflora	—	—	—	+	930 m	2,500 m	—	—	?
Saxifraga hirsuta	—	—	—	+	1,000 m	2,500 m	—	—	?
Saxifraga spathularis	—	—	—	+	1,100 m	'Mountains'	—	—	?
(Erica ciliaris)	+	+	+	+	100 m	400 m	+	—	?